



JOHN TIMMONS, supervisor of Emergency Planning Section 3232-1, coordinated plans for designing fallout shelters in eight Sandia Laboratory buildings. Employees will soon receive detailed information giving the locations of the various shelters.

L. J. Vortman Will Speak at Local Civil Defense Meeting

Luke J. Vortman (5112) will be one of the featured speakers at a symposium on "Protection from Nuclear Weapons" which will be held at Reddy's Rendezvous on Jan. 16 starting at 9:30 a.m.

The day-long meeting is sponsored by the Albuquerque and Bernalillo County Civil Defense organizations with the cooperation of the Albuquerque Operations Office/AEC, Air Force Special Weapons Center, Dikewood Corporation, Lovelace Foundation, and Sandia Corporation.

Invitations have been sent to doctors, architects, engineers, contractors, and builders; local school and government officials; and bankers and mortgage companies.

Mr. Vortman will speak on "A Risk-Oriented Approach to Protection from Nuclear Weapons." He has been employed at Sandia since 1949, principally in nuclear burst studies. During Operation Teapot at Nevada Test Site in 1955, he directed a project to study the effects of nuclear bursts on personnel shelters.

The author of several papers

and reports on shelters, Mr. Vortman presented technical testimony before the Holfield Committee (Military Operations Sub-Committee of the House Committee on Government Operations) on civil defense matters in 1958. He is a member of the National Academy of Science's Advisory Committee on Civil Defense.

Other principal speakers include Clayton S. White, M.D., director of research at the Lovelace Foundation for Medical Education and Research, who will discuss "Biological Effects of Nuclear Weapons and Their Relationship to Problems of Survival."

George A. Young, technical advisor in the structures division of the AFSWC Research Directorate, will speak on "Engineering Problems Associated with Protective Construction."

Charles R. Cole, Director, Albuquerque Civil Defense organization, will make the welcoming address. Chairman of the symposium is Walter Wood, vice president, Dikewood Corporation.

Last-Minute Christmas Charity Projects Help Needy Families

Last-minute Christmas charity projects resulted in still more deserving families being aided by food, clothing, money, and toys donated by Sandia Laboratory employees.

The projects were started when employees decided not to exchange greeting cards with co-workers but instead to use the spirit of Christmas for charitable deeds.

What was to have been a Christmas surprise for one family of seven snowballed into a turkey, games and toys, and groceries for two families totaling 12, courtesy of employees in Labor Support and Grounds Maintenance Division 4575. Two of its employees reported the plight of these needy families. A committee of six was appointed and was immediately swamped with voluntary donations of cash, canned goods, and staples. Items worth about \$50 were delivered by the committee members to each family.

Members of Mathematical Research Department 5420 collected \$100 in their Christmas fund, which was presented to the State Department of Welfare.

Employees in Employee Records and Processing Division 3153 de-

cidated to donate the \$70 they collected to PALS, a group of parents and other persons interested in the Los Lunas Hospital and Training School. In addition some furniture was presented to the school. Bernice Sanders and Margaret Clem were in charge of the arrangements.

Final tabulation shows that employees of organizations 4250, 4232-1, 4232-4 (and one of the security guards who donated \$25), contributed a total of \$260 in cash, 661 cans of food, and numerous used clothing and toys. Nine families, which had 33 children among them, were the recipients. The money was used to purchase food at wholesale prices—and, in addition, one of the supermarkets donated about 350 cans of food.

Gun Clubs Organizing

The Sandia Gun Club Big Bore Rifle Winter League will begin on Jan. 14. For further information contact Lee Neeley (2444), AX 9-0646. The Small Bore Pistol League will also start this month. Ed Carpenter (4411), ext. 46170, can be contacted for further information on this league.

Naming Fallout Shelters in Lab Buildings Part of Corporation Planning for Emergency

Fallout shelters have been designated in eight Sandia Laboratory buildings. The shelters will be used by employees if there is no time for a Base evacuation in the event of a nuclear attack.

Using procedures established by the National Shelter Program, Emergency Planning Section 3232-1, with the cooperation of Plant Engineering Department 4540, surveyed all Laboratory buildings to determine which ones would provide relatively safe protection from fallout.

These buildings are 800, 801, 802, 803, 805, 806, 840, and 860. Last week signs were placed in all

buildings to direct employees to their respective shelters.

It is expected that these shelters will be stocked with emergency supplies—food, medicine, radiological equipment, etc.—which will be provided by the Federal government.

Each employee will soon receive a folder containing emergency instructions which should be kept at his work location. The folder identifies all shelter areas by different colors, reviews warning signals, and maps evacuation routes.

If there is enough time to evacuate the Base, a steady three-

to-five-minute blast of steam horns will warn employees. Building alarms and the public address system might also be used.

A wailing or pulsating blast of sirens from three to five minutes means take shelter immediately. Because of space limitations each employee will be expected to use the shelter designated for the area in which he works.

Emergency Planning Section, headed by J. N. Timmons, continually plans for the well-being and protection of Sandia employees in the event of a national emergency. As plans progress, employees will be informed of the best procedure for protection.



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JANUARY 5, 1962

Committee Expects Wider Participation in Albuquerque 'Great Decisions' This Year

"Great Decisions—1962" is now being organized in Albuquerque. Headed by Max K. Linn (3420), chairman, the Albuquerque Great Decisions committee is expecting wider participation and more numerous discussion groups when the weekly discussion sessions begin next month.

More than 1000 persons in the Albuquerque area last year participated in the Great Decisions program. This will be the fourth year for the program in Albuquerque, one of a score of cities participating throughout the country. Sponsored by the Foreign Policy Association, a non-profit, non-partisan national educational organization, the goal of the program is to give vitality to grassroots democracy and enable individuals to participate in the important decision-making processes of our government.

Basic Plan

The basic plan of the nationwide program is to organize small neighborhood groups to meet once a week for eight weeks during February and March to study and discuss timely topics relating to our foreign policy and thereby promote better public understanding of critical international issues. The topics for the eight meetings are chosen by the FPA well in advance and background material is provided.

Fact sheets, which cost \$1.50 per set of eight, may be purchased at the Albuquerque Public Library and the three branch libraries, and at the Sandia Laboratory Technical Library in Bldg. 804.

Great Decision kits include an introductory booklet with a brief explanation of the U.S. foreign policy objectives, a fact sheet of basic background information on each of the subjects to be discussed, eight opinion ballots, a bibliography and tips for leading or taking part in a discussion group.

Begins Feb. 4

This year's program officially begins Feb. 4 with the subject "Vietnam—Win, Lose or Draw?" At the close of each discussion session, opinion ballots are filled out by participants and mailed to the Albuquerque Great Decisions Committee.

A member of the Committee summarizes the weekly results and sends the report to the Foreign Policy Association headquarters in New York City, where national summaries will be prepared and forwarded to the State Department and Senate Foreign Relations Committee. Copies of



GREAT DECISIONS displays in the City Library are checked by **Max Linn (3420)**, Albuquerque Great Decisions Committee Chairman, and **Mrs. Elsa Thompson**, City Librarian. The program of study and discussion of vital foreign policy issues by hundreds of small neighborhood groups will begin Feb. 4.

local summaries of opinion on discussion topics are also sent to members of the Congressional delegation and other government officials.

Other topics to be discussed in the 1962 program include: Red China—Third Greatest Power? (Feb. 11); Brazil—Which Way Half A Continent? (Feb. 18); Nigeria—Democracy in a New Climate? (Feb. 25); Iran—Middle East Pivot? (Mar. 4); Berlin—Test of Allied Unity? (Mar. 11); United Nations—Independent Force? (Mar. 18); and United States—New Directions in Foreign Policy? (Mar. 25).

Local Support

As in the past three years, the program is being supported local-

ly by the Albuquerque Public Schools, University of New Mexico, numerous civic groups, various women's clubs, Albuquerque Ministerial Alliance, and others.

Sandia Laboratory employees who are members of the Great Decisions committee include Mr. Linn, R. C. Colgan (3431), J. L. Fife (3425), J. C. Marsh (3422), W. H. Puder (2531), T. B. Sherwin (3431), and Wright Van Deusen (3423).

A leaflet, "Who, Me?" explaining the program is on the booklet racks this week. Sandians interested in participating in discussion groups or helping to organize groups are urged to contact Mr. Linn, ext. 25162, or T. B. Sherwin, ext. 26150.

American Management Association Accepts Article by C. J. McGarr

The American Management Association has accepted an article by Sandia Corporation's Director of Service Operations C. J. McGarr (4600) for publication as a monograph.

The article, entitled "Statistical Work Measurement: Theory and Application," is a survey of the theory of statistical work measurement and actual results of its application. Statistics gathered at Sandia Corporation are the basis for work measurement tables which comprise part of the 14,000-word monograph. It is scheduled

for publication this summer. "The idea of applying man-hours to work units as a measurement technique is not new," Mr. McGarr explained recently. "But the information resulting from an application of the idea at Sandia is new and, we feel, significant."

The article is believed to be the first material from Sandia Corporation to be accepted for publication by the American Management Association, according to W. F. Carstens of Technical Information Division 3423.

Editorial Comment

Some Blank (So Far) Pages

The desk calendar was delivered last week with its 365 blank pages. Already five of those pages (and five days) are gone. Only a few penciled notations and vague details remain. Three hundred and sixty pages are left.

We're not much interested in New Year's resolutions. Too many have gone down the drain. Still, those blank pages have a certain fascination, as any unknown is fascinating. They demand attention and some speculation.

No doubt about it, 1962 is going to be a demanding year. In the uncertainty of our time, there are some things that are certain. The demands made upon the work of Sandia Corporation will continue. The company's mission of weapon research and development is vital, and the best possible work from all of us is needed.

So many of the events of our time are out of our area of influence; we merely read about them in the newspapers. Yet, we are lucky because the contributions we do make are meaningful. The United States and the free world need our product, nuclear weapons, as a potent force for peace and survival. Strength, in this case, results in major part from how well Sandia employees perform their job.

The responsibility is a certainty. Accepting it and meeting it in the days to come will make demands on all of us. And worthwhile notations on the calendar pad.

Sandian Who Serves

Air Force Reserve Officer Heads Unit With Vital Wartime Mission

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

Since Lt. Col. Wilber G. Grisham (2311) was appointed commander of the 8504th Air Force Reserve Recovery Group in July, he has been busy training his units for their mission of providing recovery assistance to the Air Force in the event of an enemy attack.

Reserve squadrons under Lt. Col. Grisham's command are located in Roswell, El Paso, Las Cruces, and Santa Fe. The municipal airports in Las Cruces and Santa Fe have been designated as alternate airfields to be used

by the Air Force in case of a national emergency.

Military planners anticipate that many U.S. Air Force bases would be destroyed or heavily damaged if we are attacked. Aircraft returning from combat missions might be unable to land at their home stations. Under the new Air Force Reserve Recovery Program, the Reserve would provide emergency landing facilities and sites for continued operations.

Recovery squadrons at emergency sites would furnish communications, crash and rescue service, refueling, transportation, medical care, food service, emergency maintenance, billeting, and a security force.

Lt. Col. Grisham recently visited the Las Cruces squadron to witness a training exercise. At the same time the Santa Fe squadron was performing a practice training mission. Both these squadrons will be operational soon, and after the first of the year a large military aircraft from the Continental Air Command will land in Las Cruces and Santa Fe to test the readiness of these reserve units.

Lt. Col. Grisham says the Air Force needs reservists in the following career fields: Information Services, Communications, Operations, Weather, Intelligence, Transportation, Fire Protection, Administration, Air Police, Education, Personnel, Supply, and Medics.

Any former servicemen who want to become members of this Air Force team may secure more information by calling the Air Force Reserve, AL 6-3591.



Lt. Col. Wilber G. Grisham—Commander, Air Force Reserve—



SANTA CLAUS (Ernest Lovato, 4234) came to the 412 children at River View Elementary School bearing gifts for each child and cookies and candy, through the generosity of Sandia members of the International Association of Machinists and the International Brotherhood of Electrical Workers. Other Sandians also contributed. School principal Desi Baca helped with arrangements for the project.

Coronado Club Sets January Schedule; 'Hofbrau' Jan. 20

Coronado Club's featured event this month is a "Hofbrau" or German Night on Saturday, Jan. 20. German food will be served buffet-style from 6:30 to 8 p.m. Free beer will be available from 6 to 9 p.m., and also, social hour prices will be in effect from 6:30 to 8.

An international folk dance group and two dance teams will entertain from 8:15 to 9. This will be followed by dancing from 9 to 1 to the music of Hank Schultz.

Tickets may be purchased now at the club office. Cost is \$2.60 per person for members, \$3.60 for guests.

The Saturday night dance tomorrow, Jan. 6, will be from 9 to 1. Rex Elder's orchestra will play for dancing. Cost is \$1 per couple for members, \$1.50 per couple for guests. Social hour prices will prevail from 8 to 9:30 p.m.

Team-of-four bridge on Thursday, Jan. 18, will be preceded by dinner at 6:15 p.m. and election of officers. The evening's activities will cost \$1 per person. For dinner reservations, which must be made in advance, call Bob Fegan (AEC), ext. 40298.

A Teenage Record Hop, emceed by local disc jockey Kenny Dark, will be held from 8 to 11 p.m. on Saturday, Jan. 13, in the club ballroom. Tickets cost 25 cents per person, and can be picked up by parents in advance or at the door.

Basic and advanced dancing classes will start on Monday, Jan. 15, in the club ballroom. Both Latin and American dancing steps will be taught. Beginners meet at 7 p.m., and advanced students at 8:30.

The 10-lesson course costs \$6 per person, and is offered to club members only. Instructors for Latin steps are Charles (3453) and Holly Balistrere (4151), while Gail (3463) and Jennifer Ward will teach American dancing.

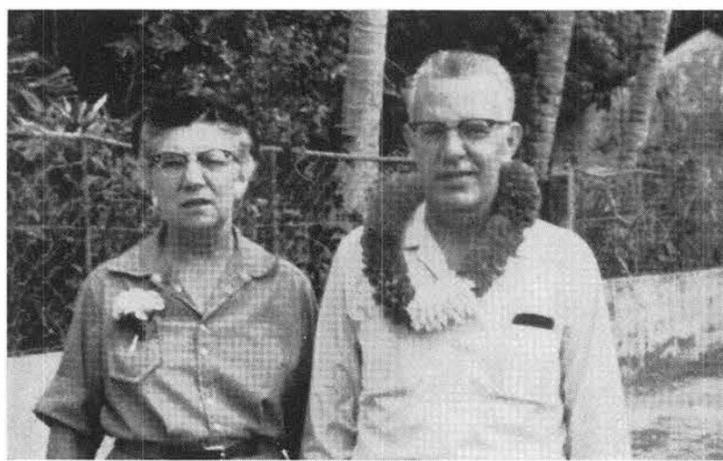
Now that the holiday season is over, Friday night activities are back on schedule. Social hour lasts from 5:15 to 6:45, and the \$1.75 buffet is served from 6:30 to 8. Tonight, Don Lesman's combo will provide music from 5:30 to 8:30, and next Friday night Max Apodaca will play.



Charlotte Cast (3113)

Take A Memo, Please

Was one of your New Year's resolutions: Be aware of safety hazards throughout 1962?



Mr. and Mrs. J. J. Miller on Fiji

World-Traveling J. J. Millers Visit South Pacific During 1961 Vacation

Tahiti, Fiji Islands, Australia, and New Zealand sound like unreachable vacation spots for the average working person. J. J. Miller (7231) is the kind of person who can make that kind of dream come true through advance planning.

J. J. and his wife, Lorena, love to travel. They have found that if they plan a trip abroad every other year, it gives J. J. time to accumulate vacation leave, time to sort and mount his color slides of scenic spots, and time to study the next countries to be visited. In 1959 they spent five weeks in the Scandinavian countries, which is about as far around the world as you can get from their 1961 destination.

Jet Flight

The Millers took the new non-stop jet flight from Los Angeles to Tahiti. The flight took eight hours and 15 minutes—and ended up two minutes off schedule. They stayed three days there, went on to the Fiji Islands for 10 days, spent seven days in Sydney, Australia, two weeks in New Zealand, and two days in Honolulu en route home.

New Zealand was Mrs. Miller's favorite stop. On the south island the scenery was "a cross between Norwegian fjords and the Swiss Alps." The couple rented a car and traveled 1600 miles even though this was J. J.'s first experience driving on the left side of the road. "New Zealand is supposed to have 48 million sheep," J. J. said. "It seemed like we saw 40 million of them. The people also are proud of their cattle, but the beef was poor by American standards. On the other hand we had some tremendous lamb dishes.

No Insects

"The country has no insects, and there are no native animals except for a type of mole. Nevertheless the two islands are so populated with deer and trout that both are considered nuisances and there is no closed season or bag limit on either."

On the south island J. J. took the most spectacular airplane flight of his life. The light plane took off from near sea level and flew close among snow-covered 11-12,000-ft. peaks before landing on a 10,600-ft. glacier.

Likes Fiji Islands

J. J. liked the Fiji Islands the best. They visited two of the 500 colorful islands and found the natives friendly and flattered to have their photographs taken. The Millers saw a number of native

dances which were similar in many ways to those of our American Indians. Here again the native food was very tasty. "Six kinds of bananas are grown on the islands," J. J. said, "and all of them tasted 10 times better than the kind we buy here, probably because they are tree ripened."

While cruising among the islands one day they reached land an hour before a heavy rain. "In fact," the Sandian recalled, "just over 13 inches of rain fell in 24 hours—about double Albuquerque's yearly rainfall. The precipitation didn't cause any flood damage since the native houses are built on stilts and the towns have storm sewers. Two days later we encountered dusty roads."

Sydney was very much like any big American city, J. J. explained. "Australians try to pattern themselves after Americans. With them the best thing that can be said is that something is American-designed. One firm even advertises ice cream made from an American recipe. The only bad thing about Australia is: the pedestrian just doesn't stand a chance!"

Wedding

Dorothy Nolasco (3462-2) was married to Andrew Santillanes on Dec. 16 at the Annunciation Church. The couple is now at home at 9209 Aztec NE. Dorothy has been at Sandia 10 years.

Congratulations

- Born to:**
- Mr. and Mrs. Marcial Valdez (4151) a daughter, Marra Louise, on Dec. 22.
 - Mr. and Mrs. George J. Hildebrandt (1330) a daughter on Dec. 9.
 - Mr. and Mrs. J. C. Gravlin (5100/3425) a son, Thomas L. on Dec. 19.
 - Mr. and Mrs. Roy Griego (4153) a daughter, Caroline, on Dec. 18.
 - Mr. and Mrs. George Horne (3451) a son, Louis Frederick, on Dec. 14.
 - Mr. and Mrs. A. Hachigian (2313) a son, Daniel Dean, on Nov. 15.
 - Mr. and Mrs. L. A. Dillingham (7122) a son, Tracy, on Dec. 25.
 - Mr. and Mrs. Gerald L. Lane (7242) a son, Gerald S., on Dec. 15.

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Org. 1431-3 Using New Device In Testing of Semiconductors

A machine, capable of programming 20 tests through 40 transistors in about five minutes, has been purchased for Semiconductor Development Section 1431-3.

The Transistor and Component Tester (TACT) is one of the first of its type on the market.

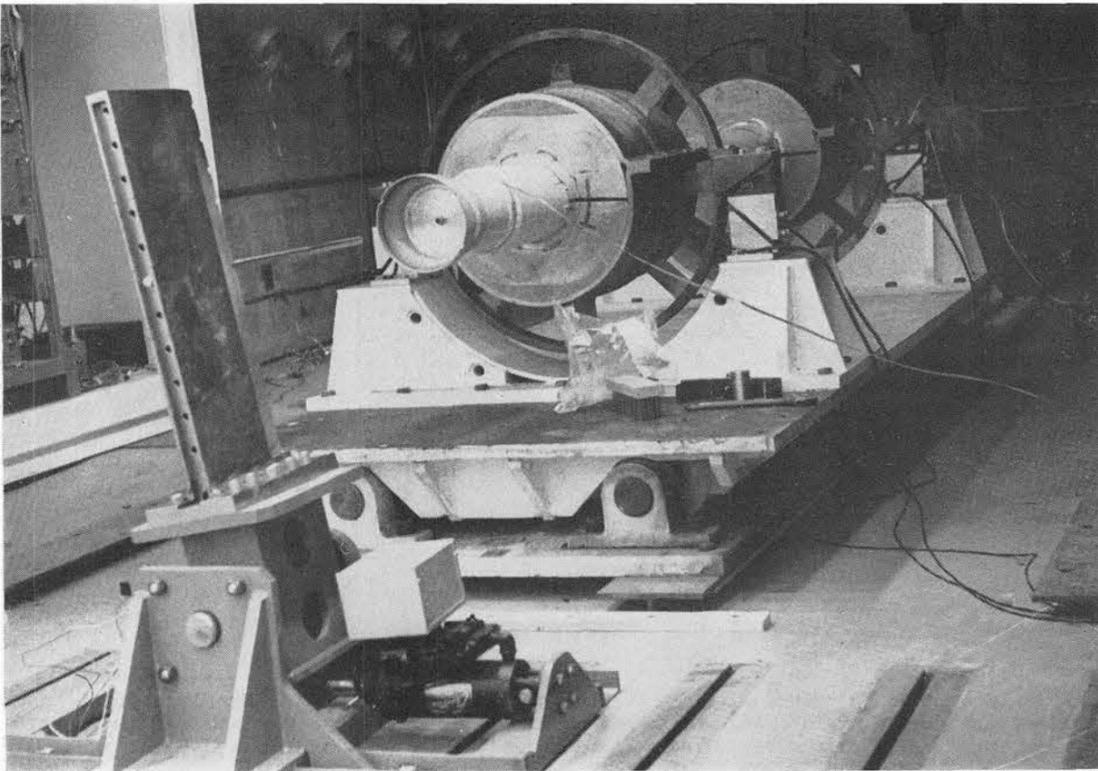
Although basically designed for testing semi-conductor devices, it will check out any device having two or three terminals. It can make small signal hybrid parameter readings at 1000 cycles, DC measurements, and pulsed measurements.

Each test is digitally programmed on a punched card. High and low "trips" cull out rejects. Electrical conditions and readout

ranges may be digitally programmed on each card. The time duration of each test may be varied, the fastest being a quarter of a second.

Limitations of the machine are: up to 500 volts at 500 milliamps; 10 amps at 36 volts; or down to one microamp at the low end of the current range.

Testing with TACT has proved to be speedy and, in addition, the same series of tests may be repeated at a future date by merely saving the programmed cards. Data is automatically recorded on tape and then may be typed on paper by a Flexowriter or else sent directly to the LGP30 computer for data reduction.



MODEL HOLDER in test cell at Hot Gas Facility is shown in position at left above, with temperature-sensing rod directly in the path of exhaust from Cajun rocket engine positioned in two round flexure support cradles on test stand at center. Strain gages (wired black boxes on rim of the cradles) will measure side and vertical loads. Firing of rocket engine is remotely controlled.

Stationary Rocket Engines Used for Variety Of Testing Purposes in Hot Gas Facility

The long, thin, blunt-nosed rocket engine rests silently in its cradle, awaiting the command which will bring it to life. In a control building nearby, engineers switch on recording instruments and sequence timers, keeping an eye on a televised image of the rocket projected by remote control on a console screen. An automatic relay is actuated; a switch is closed. The engine ignites with a roar.

In this instance, the rocket isn't going anywhere. Instead, it is being used by External Testing Section 7132-1 in a high-temperature erosion test of a component for an experimental rocket assembly. The test is conducted at Sandia Laboratory's Hot Gas Facility, located in Area III.

"The Hot Gas Facility enables us to carry on a variety of important tests and experiments which call for the high temperatures and gases generated by a rocket engine," E. J. Meyer (7132-1) explained recently. "We're also able to conduct engine performance tests, observe hot gas and blast effects on various materials, explore engine handling techniques, and measure temperature in the rocket jet blast."

Test Rocket Engines

The facility is equipped to enable scientists to check out solid fuel rockets of up to 50,000 lbs. thrust prior to flight tests at the various test ranges. Other tests made at the facility include ablation, erosion, and heat-transfer studies of scaled models and studies of squibs, explosive bolts, and heat-detecting devices.

Two buildings and an earthen barrier comprise the Hot Gas Facility, located in the northwest sector of Area III. A console building of reinforced concrete contains control and electronic data-gathering equipment.

The test cell, also built of concrete with an earthen cover on

three sides, houses the rocket engines used for the tests. It contains primary data conditioning equipment and a horizontal thrust stand which will accommodate engines of several sizes. The cell's fourth side consists of sliding doors, opened during tests to allow venting of the rocket exhaust.

A blast barrier, constructed of compacted earth, is located about 150 ft. from the sliding doors of the test cell.

Accident Insurance

"The barrier is insurance against the possibility of an accident during a test," Mr. Meyer said. "We've taken precautions to insure maximum safety during all phases of our activities."

In preparation for a typical experiment, a rocket engine is mounted on the thrust stand in the test cell. The engine is supported by flexure-supported cradles which will accommodate engines in diameter from 6½ to 16½ in., and in length from 7 to 14 ft. The cradles are supported by two strain-gaged "cages" which measure side load and vertical load during the test. The engine's forward end is placed against a thrust abutment of I-beam steel, constructed to withstand 50,000 pounds of thrust.

Model-Holder

A model-holder is located downstream of the thrust stand. It consists of a vertical strut to hold models, and pressure and temperature probes. A pneumatic assembly positions the strut in the gas stream after the engine has been ignited and test conditions are established.

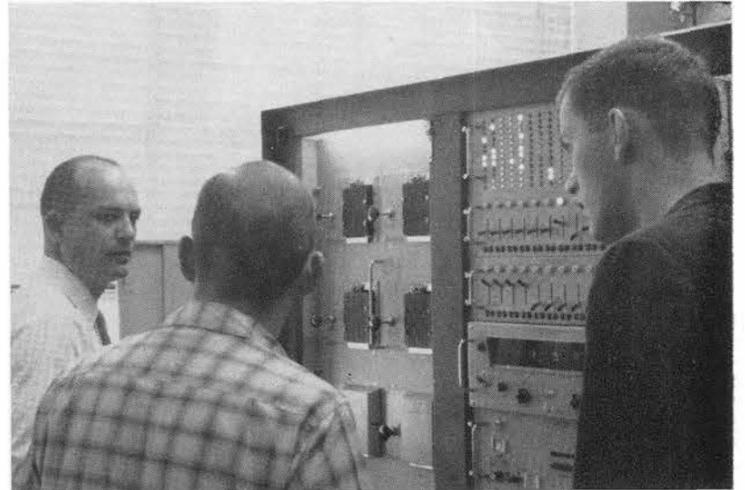
"During an experiment, we receive low-level electrical signals from transducers at the support cradles and from temperature and pressure sensors on the rocket engine and in the exhaust," D. R. MacKenzie (7132-1) commented. "The signals are amplified and transcribed as data by oscillators

and recorders located in the console building."

The firing of an engine is controlled from the console building by means of a sequence timer and countdown system which also programs the recording instruments and positions the test material in the gas jet. Manual firing is also possible.



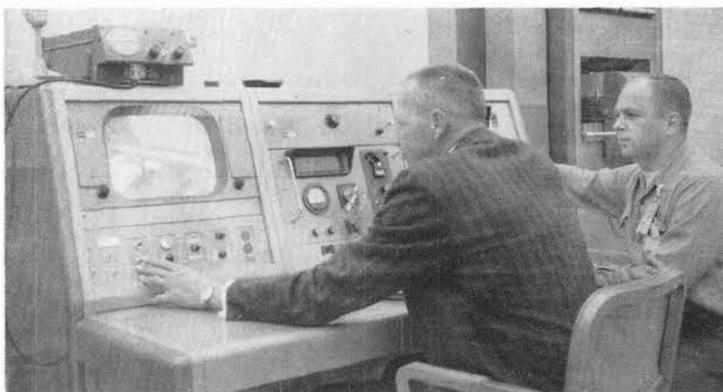
OLD FASHIONED ingenuity for space age photography is demonstrated in this candid shot of Livermore Lab photographer George Hosoda (8122-1), who was unaware photo was being taken. George rigged up the umbrella device and stood on a box to take a picture in the rain.



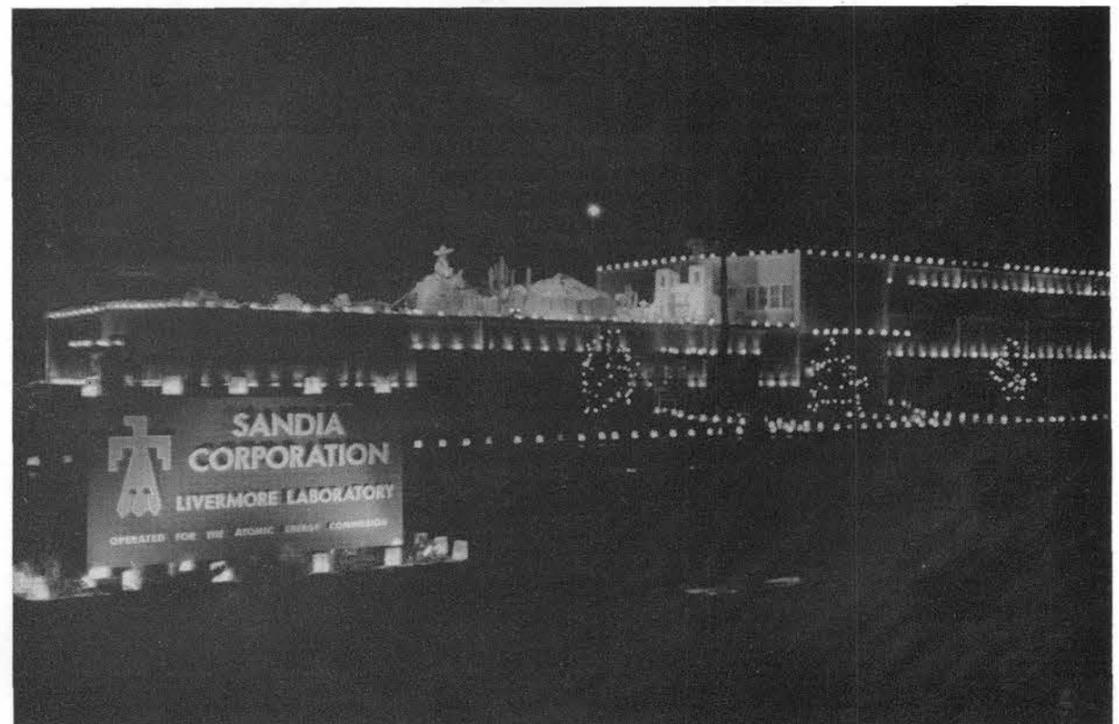
TRANSISTOR AND COMPONENT TESTER, recently installed in Bldg. 802, receives a final check-out by (l to r) Texas Instruments representative Wiley LeMoine, Jack W. Puariea (back to camera) and R. W. Martin, Semiconductor Development Section.



CHRISTMAS BASKETS for Sandia employees who were ill during the holidays are checked against a list of recipients by Marie Blakey of Benefits Section 3122-1. Fifty baskets were distributed.



TELEVISED IMAGE of arrow rocket on monitor screen in console building at Sandia's Hot Gas Facility is adjusted by E. J. Meyer, left, and D. R. MacKenzie (both 7132-1). The facility uses rocket engines to produce gas jets for aerodynamics experiments.



CHRISTMAS DISPLAY at Livermore Lab featured 400 luminarias surrounding a Southwestern scene that depicted early settlers on their way to a Spanish mission. The scene, mounted on the roof of the administration building, was complemented nightly with a program of recorded Christmas music.



INSTRUCTORS for the Sandia Laboratory Out-of-Hours Educational Program line up for a formal portrait on the steps of Bldg. 800. Key men in bringing information

of advancing technology to Sandia employees, the instructors taught 67 specialized courses to 1700 employee-students last semester. Registration for the com-

ing semester begins Jan. 22. Enrollment cards and schedule of classes will be distributed on the booklet racks next week. Classes will begin the week of Feb. 6.

Out-of-Hours Program Features Top-ranking Faculty

Seventeen-hundred Sandia Lab employees "bought" the finest product" available last semester and paid for it in good hard work. The product is self-improvement through courses in Sandia's Out-of-Hours Educational Program.

Specifically designed to present job-related information, the 79 courses of the Sandia curriculum,

with three exceptions, were instructed by Sandia Lab employees.

"Our faculty credentials would compare favorably with any educational institution anywhere," says Mel McCutchan, supervisor of Technical and Trades Training Division 3132 which administers the Out-of-Hours program. "Of the 56 instructors, 16 have PhD degrees

and 19 have Master's. Most have had previous experience in teaching and all are experts with practical experience in their areas."

Course content is planned by the instructors with the help of the 3132 educational staff. Headed by H. R. Shelton, 3121-1 supervisor, the educational staff surveys Corporation needs, schedules classes, arranges for facilities and textbooks, and keeps instructors abreast of latest teaching methods and techniques.

First in Industry

Through the work of the educational staff, the Sandia Out-of-Hours program was one of the first in industry to adopt the Programmed Self Instruction method of learning. Sandia helped pioneer the use of different "teaching machines" and tested experimental teaching programs in regularly-scheduled classes.

The staff continually evaluates the results of the Out-of-Hours program in terms of the Corporation's needs, success of teaching methods, and future requirements.

"Of all our activities," Mel says, "surveying Corporation needs is the most important. With an advancing technology, a research and development organization such as Sandia must be aware of latest developments in scientific areas. Our job, working with the instructors, is to make this information available to Sandia personnel."

Even "basic" courses such as Survey of Plastics concentrate on Sandia Corporation applications and up-to-the-minute plastics technology. In Technical Institute-level courses and other areas, classroom examples are chosen for specific application to the work of Sandia.

"The information in Sandia's Out-of-Hours program is not available anywhere else in the community," Mel says.

Tailor-Made

Some courses are tailored specifically to the needs of a line organization. In one instance, a series of mathematics courses resulted from a request by D. B. Owens, supervisor of Statistical Research Division 5425.

With Sandia's acquisition of newer computers, Mr. Owens could see that the data reduction clerks faced an opportunity to move into the programming field. The idea met with enthusiasm and the question of how to become qualified. With this in mind, Mr. Owens conferred with the Out-of-Hours educational staff and "custom-designed" a series of math courses that would prepare the clerks to use the FORTRAN programming method. Others in the Corporation expressed an interest and initial enrollment in the course numbered 60 persons.

"Job performance was raised considerably," Mr. Owens reports, "and several up-gradings resulted."

"This illustrates another function of the Out-of-Hours pro-

gram," Mel says, "that of helping employees progress on the job."

Key Man

Key man in the education process is the Sandia instructor. With an intimate working knowledge of his field and usually with teaching experience, he guides his students and fellow employees through the course. In turn, the students are expected to meet the high standards. Homework is assigned and quizzes and tests are part of the standard course. Successful completion of a course is recorded in the employee's personnel records.

About 60 per cent of the courses are held during the noon hour, the rest are scheduled after working hours. Various classrooms and

conference rooms throughout the Laboratory comprise the "campus."

Registration for the Spring Semester will begin Jan. 22. A schedule of the planned classes and enrollment cards will be distributed on the booklet racks next week. Any employee interested in classes can fill out one of the enrollment cards, obtain his supervisor's approval, and send it to Division 3132.

Classes will start the week of Feb. 5.

Anyone with questions or needing additional information is urged to contact Bill Bailey, Administrator of Education program, Bldg. 813, ext. 47255.

DIRECTORY OF INSTRUCTORS OUT-OF-HOURS COURSES

Name	Org.	Course Title
C. E. Abraham	5422	Advanced Engineering Mathematics, Part I
B. O. Allen	2442	Advanced Network Analysis
D. E. Amos	5421	Complex Variables
B. H. Anderson	1112	Survey of Plastics
P. B. Bailey	5421	College Trigonometry
S. Bell, II	5422	Tensor Calculus
A. E. Binder	1313	Mathematics III
W. H. Bradford	5422	Advanced Engineering Mathematics, Part I
W. N. Bullock	4512	Precision Leveling of Machinery
J. F. Calek	7524	Survey of Electronics
W. F. Carstens	3423	English Grammar
C. A. Corbin	4224	Welding III & IV
N. A. Cordova	4233	Drafting and Sketching
C. A. Crepin	3151	Gregg Shorthand, Simplified
D. A. Doherty	4518	Rope & Cable Splicing
J. L. Fife	3425	English Composition
Evelyn Foote	8212	Shorthand Refresher
E. G. Franzak	5152	Solid State Physics
W. L. Garner	9111	Efficient & Critical Reading
E. G. Gooden	5432	Physics I
D. L. Hanson	5425	Analytic Geometry & Calculus I
M. T. Harrison	3154	Gregg Shorthand, Speedbuilding
R. C. Hildner	5422	Analytic Geometry & Calculus II
E. Hollingsworth	5100	Gregg Shorthand, Speedbuilding
I. J. Honeycutt	4232	Welding I & II
J. A. Hood	1431	Survey of Transistor Applications
G. W. Hughes	7224	Strength of Materials, 1 & 3
O. J. Jones	5133	Analytic Geometry & Calculus II
M. M. Karnowsky	1121	Chemistry I & Metallurgy I
W. V. Knauth	3111	Programmed Self Instruction Mathematics
L. H. Koopmans	5425	Elementary Statistics
A. C. Littleford	2313	Principles & Applications of Transistors
C. K. Lumpkin	3423	Effective Speaking
A. W. McKinney	9112	Differential Equations
F. I. Magee	2313	College Algebra, Part I
S. T. Mancuso	3314	Briefhand I & II
W. B. Maxson (Science Dept., Albuquerque High School)		AC Fundamentals
W. L. Miller	3132	Industrial Mathematics, Part I
H. G. Moore	3132	Mathematics A (Programmed Self Instruction)
S. H. Neff	2533	Manufacturing Processes I
F. F. Norris	4541	Descriptive Geometry
J. P. Pupelis	4412	Engineering Drafting
E. P. Quigley	2564	Russian, Scientific-Technical, Part II
A. A. Rakoczy	7146	Mechanical Measurements
L. P. Robertson	1414	Mathematics I
J. N. Rogers	8142	Differential Equations
A. Rosenzweig (Geology Dept., UNM)		Metallurgical Crystallography
W. A. Sebrell	7182	Statics I
W. F. Sefcik	4413	Electronic Layout
H. R. Shelton	3132	Programmed Self Instruction Mathematics
D. Sparks (Research Center, UNM)		Digital Techniques & Applications
J. C. Stathis	3451	Mathematics II
R. J. Thompson	5421	College Algebra, Part I
J. L. Todd	1313	Mathematics II
D. L. Vath	7523	First Aid
G. Voda	1112	Russian, Scientific-Technical, Part I
S. C. Waldorf	4224	Welding I
M. I. Weinreich	3421	Russian, Scientific-Technical, Part III
S. E. Whitcomb	5131	Engineering Analysis
H. H. Wicke	5421	Introduction to Boolean Algebra
D. M. Wilkinson	4543	Precision Balancing of Machinery, Part II
M. G. Young	7523	First Aid, Comprehensive

How About a Sandia Claus?

Red Velvet Santa Claus Suit Arrives at Sandia Laboratory

"Before the advent of the Sandia Corporation Santa Claus Suit, Christmas operations at Sandia never seemed quite complete," A. L. "Fred" Romero, Jr. (3122-2) explained to a Lab News reporter recently. The suit arrived in a plain brown box early this year. Its origins, like those of all good Christmas traditions, are obscure.

"The box was mailed from Salton Sea Test Base, but nobody seems to know who sent it to us. And we're curious about where the people at Salton Sea got it. It's getting to be more and more of a puzzle," Fred said.

It seems that in the days before Salton Sea was phased out, a Christmas get together, complete with Santa, was held each year by Sandians at the base. When Salton Sea was put on a stand-by status, many Sandia people left, and so did the demand for a yearly Santa Claus. The Santa suit was evidently left behind.

"That's what some people think happened, but there are two schools of thought," Fred explained. "A few people feel that the suit may have been at Salton Sea long before Sandia Corporation established its facilities there."

The reporter expressed surprise.

"It sounded doubtful to me, too," Fred continued, "but no one seems to know for sure."

The suit is excellently made, complete with boots, belt, and false beard. The beard appears to be an aged one, but it's in fine condition. The material of the jacket and trousers is heavy red velvet.

"What anyone would want with red velvet at Salton Sea is hard to imagine," Fred commented. "Especially Santa Claus."

Now that it's at Sandia Laboratory, the suit will be pressed into service each holiday season

for various Christmas parties and other festivities.

"With the suit's continued use, speculations about its history will probably increase. At least we're hoping so. That's how legends get started," Fred concluded.



SANDIA'S SANTA SUIT is displayed by S. R. Toledo (3122-2). Recently sent to Sandia from Salton Sea Test Base, the suit includes velvet jacket and trousers, boots, belt, beard (slightly outdated), and still curly and full-bodied), and fur-lined hat for cold-weather night driving.

Bagpipes at 4400 Party

Sandias Corporation's Design Services Organization 4400 had a wee bit of color added to the festivities at their recent Christmas party, "The Gathering of the Clan," by an 11-piece bagpipe band. George Miller (4412-1) made arrangements for the party and the band's appearance. Other activities included a social hour, buffet, cash door prizes, and dancing.

'Voice for Mercury' Movie Set for Noontime Showings on Jan. 11, 12

Sometime this month the first American astronaut may be orbiting the earth. When he does he will be communicating continuously with terra firma through the globe-girdling network set up by the Bell System for the U.S. government.

Sandia Lab employees will see a dramatic photographic report on the communications system when "A Voice For Mercury" is shown in the Sandia auditorium, Bldg. 815, next Thursday and Friday noons, Jan. 11-12. The 13-minute color film shows actual installations and illustrates in animated diagram the manner in which continuous contact is maintained with orbiting satellites.

In addition to the film on Mercury, the Thursday noontime program will include a film report on "Growing Large Quartz Crystals." This is a story of how the Bell Telephone Laboratories developed

a method of "growing" quartz crystals for communications use, to replace the natural crystals found primarily in South America. The film is of interest to those having technical backgrounds but equally informative for non-technical people.

The Friday noon program will include a second film, "The Tyranny of Large Numbers." It is a report of how Western Electric Company improved the reliability of a small but important carbon resistor by developing an automated process for production.

The programs will start at 12:15 p.m. to enable employees to have lunch before entering the theater. The program will end by 12:50.

Social Security Taxes Go Up This Month For U. S. Workers

A further increase in Social Security tax deductions is now being made.

Effective Jan. 1, 1962 the tax rate was increased from 3 per cent to 3 1/8 per cent on each employee's annual earning, up to \$4800. At the same time, the Company's tax rate went up to match those of employees. These changes are effective for the first payday in 1962, regardless of the fact that all or part of the pay may be for services performed in 1961.

Amendments to the Social Security Act in 1961 set up periodic tax increases through 1968 when the total will be 9 1/4 per cent, or 4 1/2 per cent each for both the employee and the Company.

Men as well as women are now eligible to draw Social Security benefits at age 62. Women have had this option since 1956. As of last Aug. 1, men have been able to retire and draw monthly benefits at 62, instead of 65, the minimum age prior to the change.

Sandia Lab Guard Force Completes First Aid Course

For the first time in recent years all Sandia Laboratory security guards and security sergeants have completed the Red Cross standard first aid course.

The in-hours classes were arranged by Technical and Trades Training Division 3132. Instructors were M. G. "Red" Young (7523-3), Dennis L. Vath (7523-1), and Grant M. Johnson (4153). Nine complete 12-hour courses were offered from mid-October through late December. The course was presented in two-hour sessions.

Welcome Newcomers

Dec. 18-28

Albuquerque	
Rosa M. Bodenhamer	3451
*Charlsie F. Brunson	4333
Glada C. Costales	3126
Deanne C. Harris	3126
Jean Augusta Kirby	3126
Marlin C. Klemm	4574
*Basil K. Laskar	3432
*Barbara R. Shaw	3126
George Skinner	3465
Illinois	
Robert P. Clark, Champaign	1323
Douglas N. Frison, Chicago	4631

*Denotes rehired

Sandia Service Awards



Donald E. Hurt
2561
Dec. 31, 1946

15 Years



Bernard C. Brown
4224
Jan. 6, 1947

10 Years
Jan. 6-19

George G. Martin 4411, Flavio Gonzales, Jr. 4212, Dale G. Irving 8234, Wilfred N. Bullock 4512, Ludwig A. Eversgerd 4614, Charles E. Lewis 7534, Kenneth Patterson 4132, William R. Moore 7212, Ormand W. Williams 4632, Juan D. Herrera 4575.
Erwin C. Filsinger 2411, Phoebe Keller 3446, Adenago B. Perea 4514, Thomas A. Reinhardt 1331, Lorenzo Garcia 4212, Florence M. Smythe

4214, Edwin F. Johnson 2342, John F. Flanigan 4412, Elliot W. Harris 3462.
Candelario Garcia 4212, Robert D. Wehrle 1323, Jerry F. Dusek 2642, Joseph C. Torres 3242, Elzio A. Greene 7513, James E. O'Connor 4623, George H. Lester 4514, Edsel L. Gunn 4612, Guy W. Jones 4573, John C. DeBaca 7322, W. L. Pritchard 3242, Ruth Brown 4211.



PETE PETERSEN, one of the Telecon Desk operators, takes an order over the phone.



TELECON ORDER in hand, a two-man team of electricians leaves Bldg. 887 to start job requested by phone. In front are Paul Greenblatt, Roy Lovin.



MASTER SCHEDULE of all work in Maintenance Shops is called the "Board." Here Pete Petersen, left, and Ralph Ambrose post the day's new Telecon orders. About 30 calls come into the Telecon Desk daily requesting minor construction or maintenance work.

Telecon Desk in Plant Engineering Gets Work Done Rapidly; 20,000 Jobs Finished

This is a success story. It concerns 20,000 jobs completed since Oct. 1, 1960. Electricians, plumbers, carpenters, painters, pipefitters, welders, millwrights, and laborers have helped make the story possible.

These were the minor construction jobs, equipment installations, material moving, and repair and maintenance projects in the 124 buildings and structures of Sandia Laboratory. Men of Plant Maintenance Department 4510 and Transportation and Services Department 4570 did the work.

Each of these jobs was requested by a telephone call to Plant Engineering Department. The call came to the Telecon Desk in Bill Asher's Construction Control Section 4542-2.

LeRoy "Pete" Petersen or Ralph Ambrose take the requests over the phone and write the orders for the Maintenance Shops.

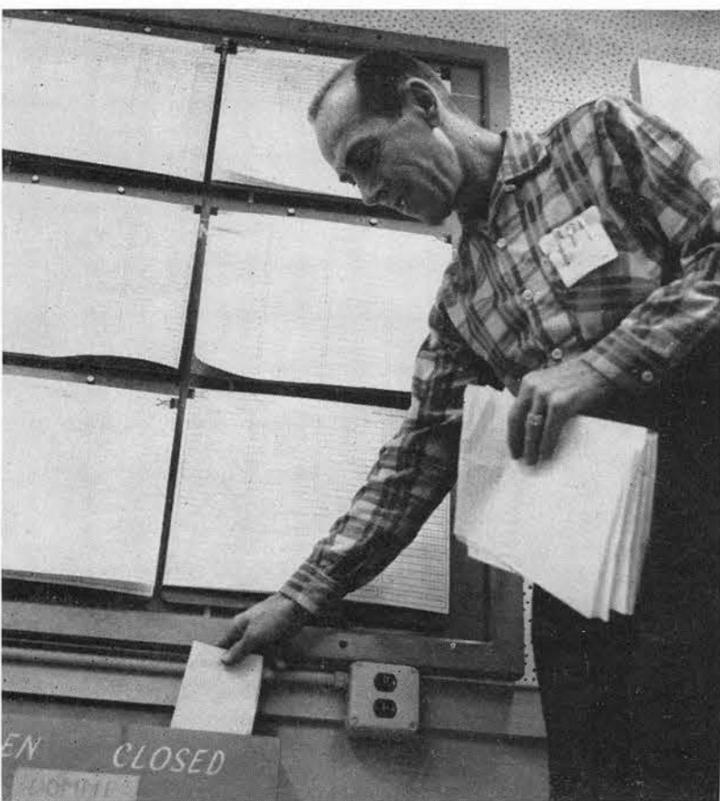
"Pete and Ralph are well acquainted with plant problems," Bill Asher says. "This knowledge helps them put most orders through with no paper work on the requester's part or any engineering time from our Plant Engineers."

However, a formal request (SC 6505-Y) is sometimes necessary. This is when engineering investigation and decisions are required for the project.

"The Telecon system places a great deal of responsibility on the men performing the work," Bill says. "Only their skill and co-operation have made the system successful. It is a matter of pride to get these Telecon requests completed as quickly as possible."

Responsibility falls also to Pete and Ralph who schedule all Telecon orders into the Maintenance Shops. Working with the Maintenance supervisors, the men are familiar with the job requirements and time involved in every project on the "Board"—a master schedule of all work in the shops.

"Our goal is to beat the board," Bill says. "If the men finish a job quicker than the scheduled time, they move ahead to handle another. In this way, we have decreased both engineering and



JOB FINISHED, Vince Domme, 4511-1 supervisor, drops copy of Telecon order in "closed" box. Maintenance men's notations on order will be added to master drawings of Sandia Laboratory if wiring, plumbing, or partitions were changed.

maintenance backlogs and we are keeping current. I think it is significant that during the time the Telecon Desk has been in operation, work processed through this system has increased to approximately 60 per cent of the total work order activity of the Maintenance Shops."

"The Telecon Desk is a service," Bill continues. "Any supervisor or his designated representative may place a request by dialing ext. 38171. Jobs are generally completed in less than a week."

In many cases, organizations have designated specific individuals to screen requests going to Telecon. This has been a great

help in eliminating duplication of requests and understanding the problems involved, Bill says.



RALPH AMBROSE, one of the Telecon Desk operators, checks "wheeldex file." The file contains a schedule card for one month's work scheduled for the Maintenance Shops.

No job is so important and no service is so urgent that we cannot take time to perform our work safely.

Supervisory Appointments

CHARLES W. JENNINGS to supervisor of Coatings and Ceramics Division 1124, Materials and Process Department II.



Charles has been at Sandia four and a half years and was promoted to section supervisor in October 1960.

Before coming here he taught for seven years in the Chemistry Department of North Carolina State College in Raleigh.

His previous experience also includes two years in electro-deposition at the U. S. Bureau of Standards in Washington, D. C., and a year in chemical research for Dow Chemical in California.

Charles holds a PhD degree in chemistry from Duke University, a Master's from the University of California, and a Bachelor's degree from the University of Toledo. He is a member of Sigma Xi, scientific honorary, and the American Chemical Society.

During World War II he served in the Navy for three years.

Walter Rediker Will Retire Jan. 31 After Eleven Sandia Years

Walter W. J. Rediker, a warehouseman in Warehouse Service Division 4612, will retire Jan. 31.



He has been at Sandia nearly 11 years.

Mr. and Mrs. Rediker live on a half-acre of land in the North Valley (at 4515 Grande Dr. NW). There they have fruit trees and two rose gardens which already occupy much of Mr. Rediker's leisure time.

He also enjoys fishing and hunting and is an avid baseball fan. The couple probably will visit in Minnesota, their previous home.

Two Accidents in Two Weeks Down Lab Safety Record

Two accidents with resulting lost-time injuries in the past two weeks have tumbled Sandia Laboratory's safety record.

The first incident involved an employee in the Maintenance Shops who was struck on the left foot by a work table on casters. At the time, the blow did not seem of enough severity to report; however, within two days pain progressively built up and the employee reported to Clinical Medicine Department 3330.

Suspecting possible cellulitis, an inflammation beneath the surface of the skin, the Sandia doctor had the employee hospitalized. After several days in the hospital, the employee recovered and has now returned to work.

The second accident involved an employee who was using an oxy-acetylene torch to break a soldered joint in the copper tubing of a discarded refrigerative-type cooling unit for reclamation. When the joint opened, flame shot out and enveloped the operator. He received burns on his face, neck, and chest.

Investigation showed that the probable source of the flame was lubricating oil in the unit which, due to residual pressure in the line, was in the form of a mist or spray and was ignited by the torch.

The employee was treated by Clinical Medicine Department 3330 and sent home. He has since recovered and returned to work.

Corrective measures have been taken by the operating organization to prevent recurrence of a similar incident.

Sandia's Lab safety record now stands at 420,000 employee-hours or 12 days worked without a disabling injury.

CHARLES WINTER to Manager of Advanced System Studies Department II, 9130, Sandia Laboratory.



Charlie joined Sandia Corporation in 1952, where he worked in engineering groups until 1956, when he transferred to Livermore. He was promoted to supervisor of a project engineering section at Livermore Laboratory the following year and became supervisor of the Preliminary Analysis Division in 1958.

Before joining Sandia, Charlie worked for Electrol, Inc., Kingston, N. Y.

Previously he was in automotive research with the Texas Company, Beacon, N. Y., for four years.

Charlie received his Master's degree in Mechanical Engineering at Harvard University in 1947 and also studied Mechanical Engineering at the City College of New York. He is a member of the American Society of Mechanical Engineers.

ANDREW A. LIEBER to Manager of Advanced System Studies Department I, 9120, Livermore Laboratory.



Andy joined an Electrical Division (1321) at Sandia in July 1952.

Two years later he was promoted to supervisor of design section 1325-1.

In 1958 Andy was named supervisor of the Fuzing Systems Division (1262) and last September he transferred to Livermore Laboratory to head the newly formed Advanced System Studies Division 9112. His work has been principally in the area of systems design and project engineering.

Andy received a BS degree in Electrical Engineering from the University of Louisville, Ky., in 1952, joining Sandia after graduation.

A registered professional engineer in New Mexico, Andy belongs to Sigma Tau, engineering honorary society, Phi Beta Phi, scholastic honorary, and Omicron Delta Kappa, men's leadership honorary society. He is also a member of the American Ordnance Association, and an alumnus of Theta Tau, engineering fraternity.

He served in the Army in 1945-1946 in the field artillery.

Sandian Who Serves

University Work Leads to Outside 'Career' With Senior Adults Group

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

About a year and a half ago Maxine Stephens was writing a paper for a UNM sociology class on problems of retirement. She requested information and literature from Bert Quelle (3122-1), who handles Sandia's pre-retirement counseling program.

Bert told her about a community organization which had recently been formed called Coordinated Action for Senior Adults (CASA). The group was primarily interested in planning activities and providing services for senior adults in Albuquerque and Bernalillo County.

Maxine became interested in CASA and when she learned they needed a secretary she volunteered her services. In addition to routine secretarial duties Maxine arranges meetings, and sees that members receive copies of the minutes that she takes at these meetings.

Livermore Lab Adds New Centrifuge, Shock Machine to Test Laboratory

A centrifuge that can spin a ton and a half load, a shaker that jiggles up to 3000 times a second, and a shock tester that works like a pile-driver in reverse were expected to go into operation at Livermore Laboratory this week.

"These new additions will expand our capability for simulating shock, acceleration, and vibration environments," said Ed Daugs, supervisor of Induced Environment Section 8121-1.

The Hyge shock tester can generate sawtooth, square, and half-sine shock waves. Nitrogen, under high pressure, slams a carriage from the ground straight up a two-rail track to create the shock. In addition, the tester is equipped with controls that can vary the shock level.

The centrifuge has a 16-ft.-long arm that can whip around at 235 rpm with a 400-lb. load on the end. Under this kind of a load it can build up 150 g's on the test unit. At the other end of its range, the centrifuge can produce 20 g's on a 3000-lb. unit.

The new shaker, now being checked out, will be used for general vibration testing. It can jar a test unit anywhere between 10 and 3000 times a second with a force equivalent to 7500 lbs.

"We're also moving our two pendulums into a new structure where longer suspension cables will be installed to give us greater accuracy," Ed said. "The new cables will be about 20 ft. long."

The pendulums measure the amount of force needed to shift the position of an object riding free in space. One pendulum measures pitch and yaw; the other measures the moment of inertia.



FINAL ADJUSTMENTS on Livermore Lab's newly-installed centrifuge are made by Harry Jacobs (8121-2), foreground, and Bill Maxwell (8121-1). Mounted in the center of the boom is a closed circuit television camera which will enable engineers to view test components while the centrifuge is in motion.



AEC CHAIRMAN Glenn T. Seaborg, fourth from left, enters Livermore Laboratory during a recent visit. With him are, from left, Dr. Arnold R. Fritsch, staff assistant to Mr. Seaborg, Russell H.

Ball, assistant manager for Technical Operations at AEC-SAN, Brigadier General Austin W. Betts, director of the Division of Military Applications, AEC, and Loren K. Olson, AEC commissioner.



Maxine Stephens (3126)

—Interested in problems of retirement—

Metal Trades Council Elects New Officers For Coming '62 Term

Leadership for the coming year was elected by members of the Metal Trades Council Dec. 6. Edward J. Peterson (4253) was re-elected president of the organization. Serving as vice-president will be Merle Alexander (4224). Secretary-treasurer is Joseph Maldonado (4624).

Leland Pierce (4224) was elected recording secretary. Sergeant-at-arms is Glenn Haycock (4512).

Alice Oberle (3462), Jose Jajola (4513), and Max Miller (4514) were elected trustees.

Salvage Yard Shoppers Can Buy Most Anything

Looking for a place to shop for a gift for that friend or relative "who has everything?"

You might try one of Albuquerque's most unique shopping centers—Sandia Corporation's salvage yard. You name it; it's probably been available at the yard one time or another, if not now.

The "merchandise" consists of surplus items and materials from Sandia Laboratory which are not usable by the AEC, military, or other government agencies. It does not include the items which are offered for sale periodically on a bid basis.

The operation is part of Receiving and Reclamation Department 4620, which is headed by Robert Findlay.

People will buy the darndest things, and use them for the darndest purposes, say salvage yard employees.

Large nonreturnable wire cable spools are popular for conversion into picnic tables. Wire and metal equipment housings often are bought to become bird or animal cages. A can sealer once was eagerly snapped up for some unknown purpose — maybe to seal cans.

And when women are the purchasers, scraps of plastics or metals—it doesn't matter how big or how small they are—go home to be transferred into interior decorating devices.

Noontime shopping, conducted every working day, attracts scores to buy the salvage yard's wares. The goods include almost anything imaginable from nuts and bolts, and tiny electronic and electrical components, to massive refrigeration units and large electric power plants.

The salvage yard's patrons are not confined to people from Sandia Base, nor just Albuquerqueans either.

"They come from the farthest points of the state to buy our merchandise," reports W. O. Smitha, supervisor of Processing Salvage

Division 4621. He said ranchers from such places as Deming and Moriarty come "quite often" to shop at the yard.

An average of about 130 customers per day shop the salvage yard during lunchtime, which is the only period it is open for cash sales. J. H. "Sam" Samuelson, supervisor of Salvage Section 4621-1, said records indicate that 241 is the largest crowd that has shown up for the daily sale.

And generally about half the people have no connection with the base, he said.

The man who conducts the "business," and has for most of the past 10 years, is T. B. "Ted" Harris (4621-1).

Ted said he cannot recall any time when the weather was bad enough to keep hardy devotees away. The only time the yard has been closed, he said, was during a three-day period a few winters ago when Sandia was blowing out from under an 18-in. snowfall, and even then a few appeared at the yard gate at the appointed hour, seeing no reason why it shouldn't be "business as usual."

Open At 12:10

The gates swing open promptly at 12:10 p.m. each working day. A sizeable crowd generally has gathered outside the gates by then, and in they rush—some at a dead run in order to have first crack at whatever new has been put out for sale that day.

The lunch-hour patrons, many with sandwich in hand, then settle down to their shopping — some scurrying frantically from this bunch of items to that, and others just leisurely browsing about. A five-minute warning bell sounds, then at 1 p.m. gates are closed until noontime tomorrow.

Women make up approximately five per cent of the shoppers. One woman once bought a large roll of colored tape for Christmas decorations, but most of them come looking for furniture, appliances, fixtures, and other household-type items primarily.

Ted said, "We have been able to supply many of these requests—about all we haven't been able to offer yet is a bathtub."

Students Are Customers

College and high school students make up a large portion of the customers during the summer and other vacation periods.

The yard attracts children, too. All of its employees, know especially one little girl, about five, tow-

headed, "and cute as a button." She comes with her father almost every day, and while he shops, she tags along after yard workers, obviously fascinated with everything.

Customers' eyes often are bigger than the conveyance they have to get their larger prizes home.

"They'll often take off with some big item just barely tied onto the car, hanging out the trunk, or

something," Ted said, "and we wonder if they ever got home with it all right."

Only one request was recalled that really stopped salvage yard employees cold. An elderly-sounding lady phoned one morning and inquired:

"Do you still have those puppies for sale?"

The yard has never had any yet, but who knows what tomorrow will bring?



THIS IS H-HOUR at Sandia's salvage yard—12:10 p.m. when the gates swing open for another lunch-time shopping hour. The customers fan out in all directions as some gallop swiftly to get first pick.



ENTHUSIASTIC SHOPPERS crowd around the bins of surplus electronic and electrical gear for sale at the salvage yard. At left can be seen a few of the steel "igloos" which were erected recently to protect some of the more delicate items from possible damage by inclement weather.



WATCHING FOR just the right pieces of lumber at the salvage yard for next weekend's project at home are (l to r) H. F. "Hank" Ward (1331), D. L. "Lew" Longmire (1322), and H. H. "Ken" Williams (1333). The camera is peering at them through a stack of surplus cable spools, bought for conversion to picnic tables.



CHECKING OUT with their purchase from the salvage yard, Hank Ward and Lew Longmire get their receipt punched by yard employee Candido Montoya (4621-1). Ken Williams follows with what looks as though it might possibly be on its way to becoming a super deluxe lunch basket.

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. 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

FOR SALE

'55 CHEVY 2-dr., 39,000 miles, one owner, automatic transmission, heater. White, AL 5-7596 during day.
 GE electric rattisserie oven, new, \$75. Hedman, AX 9-2077 after 6 p.m.
 STEREO CONSOLE/ETTE, 4-speed reco. d player, new. Geck, AX 9-5095.

HAM RIG, 10 meter mobile, complete, operating, \$60; PA amplifier and speaker, \$15; two cocktail dresses, sizes 12 and 14, \$15 and \$5. Grab, AX 9-0015.
 FIAT 500, 1959, better than 30 mpg in town, 11,000 miles, 2-tone, blue and white, convertible, \$600. Hann, 10204 Arvada NE, AX 9-3591.
 PARKARD-BELL combination 21" TV, record player, radio in blond wood cabinet, \$75. McMaster, 6308 Kiowa NE, AM 8-8062 after 5:15 p.m.
 21" CONSOLE MODEL GE television; portable record player. Randall, 256-1853.
 CARGO TRAILER completely enclosed, 4x8x3' overload springs, 7:10x15 Good-year Suburban tires, spare wheel and tire. Qualle, 3200 California NE, AM 8-2827.
 '55 TR-2, \$550; '58 4-speed 3/4-ton GMC with camper, 21,000 miles, trade for vacation trailer. Coalson, AX 9-0717.
 '57 MGA, new wsw tires, customized interior, 50,000 miles, wire wheels, see to appreciate, \$1000. Pilkington, AM 5-0013 after 5:30 p.m.
 '55 CHEV pickup. Silva, DI 4-6714.

NEXT DEADLINE
 FOR SHOPPING CENTER
 Friday Noon, Jan. 12

EARLY AMERICAN living room and Chinese modern den furniture. Bode, 3707 Hannette NE, AM 8-2157.
 '60 FORD country sedan, 6 passenger, PS, PB, factory air, R&H, will take trade. Calvery, 299-0455.
 GI no down or assume existing 4 1/2% GI, large 2-bdr., attached garage, patio, extra large lot w/bearing fruit trees, other financing available. Knight, 299-3783.
 SKI PANTS, man's 31-31 and lady's size 10, \$3 ea.; child's ski bindings for use with regular shoes, \$1.50. Sherwin, AL 5-8866.
 DALMATIAN PUPPIES, registered, male, female, available in two weeks. Erbe, AX 9-7430.

'52 CHEVROLET, stick shift, 6-cyl., heater, in good running condition, \$100. Ahr, 932 Florida SE, AM 5-0653.
 HIGH CHAIR, Cosca, chrome and yellow, \$10. Miller, AM 8-5992.
 ADMIRAL APT. space refrigerator, \$45. Hurley, 298-4440.
 UNFINISHED BOOKCASE; dresser w/4 drawers, no mirror; 2 ac electric m/w/s. Pitti, AL 6-1629 after 5 p.m.
 40' 2-BDR. Spartan Trailer, w/w carpet, many extras, trade \$2800 equity for small clear trailer, \$1200 or ??, balance \$2605. Aaron, BU 2-3124 eve. Sat. or Sun.
 '50 CADILLAC, 4-dr., R&H, motor in good condition, \$395. Fuller, AX 8-4721 before 1 p.m., or Sunday.
 '57 MERCURY Montclair, PS, PB, w/w, Turnpike engine; 1 set twin bed frames. Amador, CH 2-2080.
 '60 AUSTIN HEALY roadster, OD, radio, 22,000 miles, sell or trade. Lewing, AX 9-3193.
 PUPPIES for give-away, mixture of Toy Shepherd, Cocker, and Scottie, all female, 7 weeks old. Russell, 7738 Rob'n NE, AX 9-6921.

3-PIECE FOAM RUBBER SECTIONAL, \$60; limed oak double bed frame. Libby, 299-5948.
LOST AND FOUND
 LCST—Grey sunglasses in blue and white case, Rayban sunglasses with brown frames and grey lens, charm bracelet with turquoise and gold coins, SC 10-year tie chain. LOST AND FOUND—ext. 26149.
WANTED
 RIDE, 9209 Aztec NE to Bldg. 802. Santillanes, ext. 36147.
FOR RENT
 DUPLEX w/stove and refrigerator, garbage and water paid, \$60/mo., 417 1/2 Rhode Island SE, Alameda, TR 7-0259.
 3-BDR. HOUSE, available Jan. 1, 1312 Luthy Cir. NE. Pino, AX 9-5980.
 CLEAN 2-bdr., \$80/mo., 7441 Sky Court Cir. NE, 2 blks. from Winrock, house is open. Kiefer, CH 3-6940.
 528 CARDENAS SE, 2-bdr. apt. w/stove & refrigerator, completely redecorated, storage space, water and garbage paid. Tillman, AL 5-6292 after 5:30 p.m.

New Clean Room Called 'Significant Breakthrough'

Cleaner than the cleanest . . . This is a concise but accurate description of the atmosphere attainable within a new, experimental ultra-clean room designed and developed in recent months by Advanced Manufacturing Development Division 2564.

Built on a completely different principle from those utilized in conventional clean rooms, the new chamber makes use of a unique air-flow pattern to reduce contamination by microscopic dust particles to low levels never before attainable in clean room facilities.

Division 2564 has been investigating clean room design and practices because of the growing need for cleaner and cleaner environments for the assembly of increasingly complex and miniaturized Sandia components.

D. W. Ballard, supervisor of Division 2564, said the completely new clean room design was developed because "we could see serious deficiencies in even the best conventional clean rooms. They are all just copies of old ideas." Data taken and analyzed since the ultra-clean room facility was put into operation in mid-November have demonstrated results in the elimination of contaminating dust that are "far beyond what were our most optimistic expectations," reported Mr. Ballard.

Significant Breakthrough

"The development of this unique clean room is a significant breakthrough in providing an ultra-clean manufacturing environment," said L. A. Hopkins, Jr., Director of the Manufacturing Development Organization 2500.

The new design results in a clean air-flow pattern that simply "washes" away dust particles generated within the room from the clean room's work bench, on which can be assembled intricate

and delicate mechanisms with extremely tight tolerances, which must be kept absolutely free of such contamination.

"The cleanest air in the world is what we have," J. Gordon King, supervisor of Section 2564-2, declared. "We can make this statement literally about the atmosphere that is produced inside this completely new type of clean room."

100 Times Cleaner

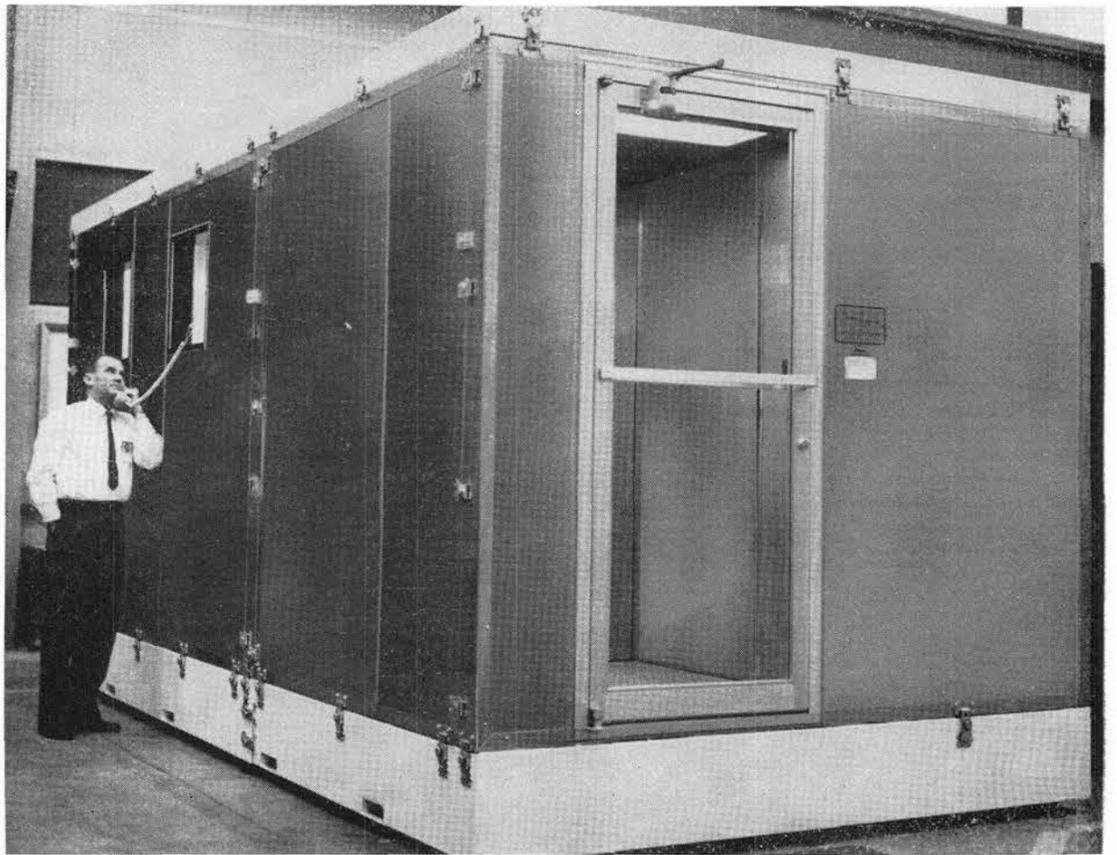
Dust particle counts taken during "shake down" tests of the new facility show that it creates a work area environment that is more than 100 times cleaner than filtered air hoods and 1000 times cleaner than that achievable in the most efficient clean rooms developed by industry heretofore.

Test data show that dust particle contamination in the new clean room's work area averages less than 750 particles one-third of a micron in size or larger per cubic foot of air. (A micron is equal to 40-millionths of an inch.)

For the same microscopic size of particles, dust counts average more than a million particles per cubic foot of air in one of the best conventional clean rooms in use today. And the average count is more than 100,000 in the air hood devices considered super clean. Particles less than one-third micron in size generally are of negligible concern. "In fact," Mr. King said, "particles up to five microns cause no trouble, in general, in present-day industrial operations."

Named for Whitfield

"The new clean room has been named the Whitfield Ultra-Clean Room, after Willis J. Whitfield (2564-2), the physicist who conceived its unique design," Mr. King added. Others who contributed significantly to the development of the new facility include R. C. Marsh, J. F. McDowell, J. C. Mashburn, and W. E. Neitzel



PHYSICIST Willis J. Whitfield (2564-2), designer of the Advanced Manufacturing Development Division's ultra-clean room, uses the facility's intercommunications system. The chamber is portable, either as a unit or it can be dismantled, moved in parts, and reassembled.

(all of 2564-2); I. M. Kodel (2543-1); and H. H. Baxter (4543-2).

The new clean room, which inside is 10-ft. long, six-ft. wide, and seven-ft. high, has the advantage of being portable either as a unit or in parts. The facility can be completely dismantled and its parts moved through any doorway that is at least three-ft. wide and six-ft. 8-in. high.

It also is completely self-contained, with all its air conditioning, filtering, and blower systems housed in its walls. The assembled clean room with its associated air lock can be transported on any national highway since it meets the Interstate Commerce Commission's size regulations.

The air-flow pattern in the Whitfield Ultra-Clean Room works this way:

The work bench is mounted along one wall of the chamber. Directly over it and along its full length is a four by 10-ft. bank of absolute filters through which clean air enters the room. (An absolute filter is 99.97 per cent efficient in removing particles larger than 0.3 microns; cigarette smoke blown in one side comes out the other as clean air.)

Air Movement

The air is circulated in the room at a rate of 4000 cu. ft. or about 10 changes in air per minute. Since this air delivery is spread uniformly over the 40-sq.-ft. area of the filter bank, this tremendous amount of air movement is barely perceptible to one standing immediately in front of the filters. The linear speed of air is slightly more than one mile per hour.

The air passes over the work area, carrying away any dust particles as it goes. The air then goes into the floor, the entire surface of which is a grating with "rough" filters underneath. These rough filters catch and hold many of the dust particles as the air passes through to the air conditioning and blower systems, to be recirculated into the room again through the absolute filters over the work area.

Thus, this constant flow of clean air performs a continuous "sweeping" function over the work bench, and virtually all dust particles that are introduced—both microscopic and visible ones—are carried immediately to the floor and trapped before they can get into the work on the bench.

Clap your supposedly clean hands over a powerful light source on the work area and watch a flood of tiny dust particles you didn't even know existed be

whisked away toward the floor before they even have a chance to start dropping to the surface of the work bench.

The clean room's air circulation is controlled to keep the pressure inside slightly higher than that outside so there will be an outward movement of air to offset dust contamination any time the chamber's door is opened. The circulation system also provides for introduction of enough new air to keep the atmosphere fresh for persons working inside.

Conventional clean rooms make no use of such large amounts of air exchanges and air movement for such "sweeping" purposes. The air in them is filtered and circulated but only to the extent necessary to clean the incoming air and to keep pressure inside higher than outside.

Instead of being a trap to catch and hold dust particles from any further circulation, the floor in a conventional clean room is just a platform on which particles fall and lie, ready to be stirred up again by virtually the slightest movement in the room.

Also in normal clean rooms, constant vacuum cleaning is required, and personnel must wear special clothing and take other precautions to make themselves as dust-free as possible before they enter. None of these time-consuming measures is necessary in Sandia's new facility.

Conventional clean rooms require so much time and cleaning effort to reach low levels of dust contamination after they are put into operation, that most of them are never shut down, and must be kept operating 24 hours a day to stay clean.

Mr. Whitfield said the new clean room cleans itself almost immediately after its air circulation system is turned on. This means it need be operated only while it is being used, making possible considerable savings in operating costs.

Other Advantages

Another advantage of the new facility, Willis said, is that access to the chamber need not be closely restricted as it is in normal clean rooms. He said movement in and out of the room of people in their regular street clothes has caused no significant rise in dust counts.

Even smoking in the clean room has had a negligible effect on its dust contamination level. Smoking is absolutely forbidden in conventional clean rooms.

No Smoking

However, Willis hastened to explain, smoking will be omitted

from the normal operating procedures of the new clean room, too—the smoke and ashes would clog up the filters too quickly.

The new chamber, which was built to Sandia's specifications by Agnew-Higgins, Inc., Los Angeles, has an anteroom containing an air shower through which people entering the chamber can pass to rid themselves of dust. But Willis said it has been found that this precautionary measure is unnecessary; the dust count stays just as low without use of the air shower by persons entering.

Other accessory equipment includes a double-doored assembly pass-through at one end of the chamber, and telephone communications between inside and outside.

While the experimental clean room is relatively small, Willis said it appears to be feasible to build larger ones using the same design principles without measurable loss in efficiency in maintaining the extremely low dust contamination levels. Or a number of the small ones could be connected together end to end in order to increase working space, he explained.

One of the advantages in the portability of the new clean room is that it can be readily moved to and from suppliers' plants. This can facilitate the testing of early component prototypes to determine whether a given supplier needs clean room facilities of his own. It also makes it possible to provide clean room facilities temporarily and at low cost to designers and suppliers who need them only a short time for a single project.

Along with the obviously wide possibilities in industrial applications for the new ultra-clean room, Mr. King sees a potential benefit to the medical profession from its design principles. He said an operating room built on this order could have an atmosphere many times cleaner than that in the most modern operating rooms in use today.

"The clean air found in the Whitfield Ultra-Clean Room appears to be a real advancement in the quality of clean environments," Mr. Hopkins declared.

"Of equal or greater significance is its freedom from current restrictions imposed on personnel and operations in conventional clean rooms. We intend to capitalize on this breakthrough by providing Sandia engineers and our suppliers with the best possible assembly environments for their components."



DUST COUNT DATA showing the extremely low level of contamination in Sandia's new ultra-clean room are taken by W. E. "Bill" Neitzel (left) and Willis J. Whitfield (both 2564-2). Super clean air enters the room through the bank of absolute filters over the work bench at right, and sweeps dust particles away from the work area and into filters located beneath the floor grating.

Sandia's Safety Record

**Sandia
Laboratory
HAS WORKED
420,000 MAN HOURS
OR 12 DAYS
WITHOUT A
DISABLING INJURY**

**Livermore
Laboratory
HAS WORKED
195,000 MAN HOURS
OR 41 DAYS
WITHOUT A
DISABLING INJURY**