

# Gov. Jojola Sees Progress For Isleta

Isleta Pueblo had a democratic form of government long before the Constitution of the United States was drafted. As far back as the "old people" can remember and their grandfathers before them, the chief of the Isleta was elected by the people to govern for a year.

Juan B. "Abie" Jojola (4252-4) is the latest "chief" of the Pueblo, only nowadays the title is "governor." Abie took office last week by receiving the two canes which are the symbols of authority in the pueblo.

One of the canes was presented to the village in 1620 by emissaries of the King of Spain. The second cane, ebony with a silver crown and tip, was presented to the pueblo by President Lincoln in 1863. It was one of several given to New Mexico pueblos in appreciation of the peace-loving village tribes when the U.S. was trying to quell the nomadic Plains Indians.

As governor, Abie is responsible for the reservation, some 500,000 acres 17 miles south of Albuquerque. The governor is the sole representative of his people to "outsiders." He is responsible for the business affairs of the pueblo as a whole and presides over the 12-man Tribal Council. He also appoints three judges and a police force.

Abie was not a candidate for the office of governor in the conventional sense. Adult members of the tribe register each year, and at that time, they are asked whom they would like to have as governor. At the end of the two-week registration period, the nominations are counted and the three men with the most nominations, along with the immediate past governor, then become candidates. An election is held on Dec. 30 to elect the governor.

The man who receives the most votes becomes governor. The second highest vote-getter becomes president of the council and the third highest becomes vice president of the council.

The governor appoints four men to the council and names two lieutenant governors. The president appoints three men to the council and the vice president appoints three more. The council is the ultimate authority of the pueblo and makes its decisions democratically. The governor must abide by council decisions and administer its decrees.

The three men appointed judges form the Pueblo Court which hears all disagreements among members of the pueblo and has jurisdiction over all misdemeanors. Felonies, rare among the Isleta, are tried in District Court. Decisions of the Pueblo Court may be appealed to the Tribal Council which, in such instances, forms the Council Court. Its decisions are final.

Abie has served four terms as a member of the Pueblo Court, under four different governors. He has served on the council and held offices as council vice president and lieutenant governor.

Abie sees no particular problems confronting the pueblo during the coming year, only progress. Negotiations are un-



ABIE JOJOLA, governor of Isleta Pueblo, has been a precision machinist at Sandia Laboratory since 1950. His current assignment is in Shop Section 4252-4.



CEREMONIAL COSTUME of the Isleta Pueblo is worn by Abie Jojola, new governor of the tribe. He holds the two canes which are the symbols of authority in the pueblo. Ebony cane, left, was presented by President Lincoln in 1863 and the other by the King of Spain in 1620. Village elections were held Dec. 30.

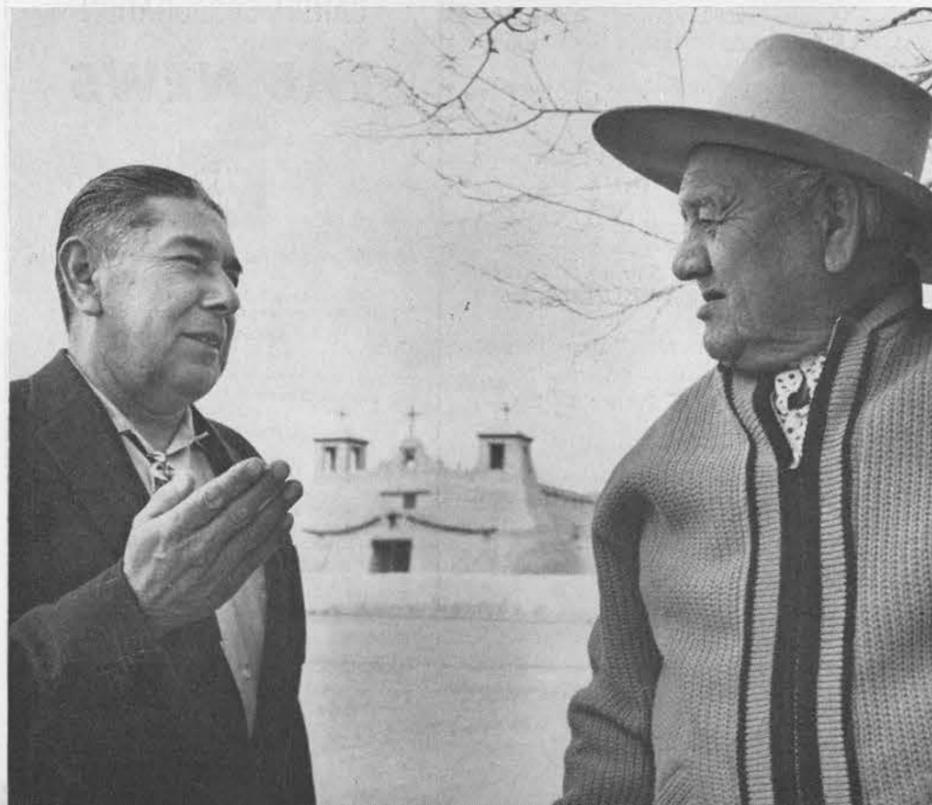
derway to lease Isleta land to a canning factory and plans are being discussed to improve reservation roads.

Most of the men of the 500-family tribe hold jobs in Albuquerque and commute daily from the reservation. Some of the members of the tribe own homes in Albuquerque. In addition to Abie, four other Isletas work at Sandia Laboratory—Demus Jojola (4253-2), his brother; Bernie Jojola (4513-3), a distant relative; Johnny Abeita (4412-5); and Albert Cherino (4513-3).

Abie has been a precision machinist at Sandia since 1950. He learned the trade, including tool and die making, as a silversmith. His hobby now is making heavy turquoise and silver Indian jewelry.

The nickname "Abie" is a carryover from his student days at the Indian School in Albuquerque. In a speech contest, he recited Lincoln's "Gettysburg Address" and did so well that his classmates started calling him Abraham, Honest Abe, and finally, Abie. His Indian name is White Eagle.

NEW GOVERNOR of Isleta Pueblo, Abie Jojola (4252-4), left, discusses village affairs with Lieutenant Governor Philippe Jiron. In background is the Pueblo Church built in about 1620 by Spanish missionaries.

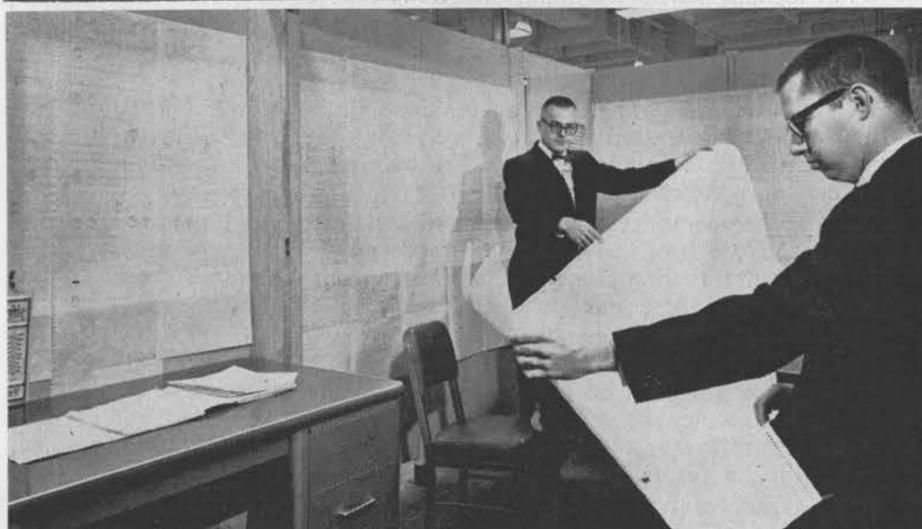


SANDIA CORPORATION

# LAB NEWS

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

VOL. 16, NO. 2 / JANUARY 17, 1964



## New Program Makes Workflow Charts for Sandia PERT Programs

Phil H. Arnold and Tom Fox of Applications Oriented Systems Section 7624-1 have written a computer program for use with the 7090 Computer and the Calcomp Plotter in preparing network diagrams for PERT programs.

PERT (Program Evaluation and Review Technique) is now familiar to many Sandians as a computer-aided technique for the management and control of large projects.

"Information for PERT programs is processed by the 7090 Computer, and emerges as several individual output listings," Tom explains. "The IBM Corporation has written and prepared a computer program which takes these listings as input and prepares a diagram or chart show-

REDUCED size and enlarged usefulness characterize Calcomp-prepared PERT chart being examined here by authors of computer program which prepared it: Phil Arnold, in background, and Tom Fox. Both are in Applications Oriented Systems Section 7624-1.

ing various 'events' and the lines of work flow, along with the PERT 'critical path' and other features. However, the computer-prepared chart is too large to be conveniently displayed and utilized. And it is prepared piecemeal on sheets of tab paper which must be pasted together.

Phil's and Tom's program converts the IBM program output onto magnetic tape which can, in turn, be used on the Calcomp Plotter, a device which records its output graphically. The result is a handsome, compact diagram, similar to its computer-prepared counterpart in content, but superior to it in readability and compactness.

"Actually, the Calcomp-prepared chart presents more information than the computer-prepared chart," Phil explains. "And, because of its compactness, it's considerably easier to work with."

## Researcher Points Out That Man, Computer Work Creatively

At a recent meeting of the Sandia Laboratory Research Colloquium, D. T. Ross of Massachusetts Institute of Technology discussed aspects of computer-aided design.

He discussed the data structure used with a computer to enable it to keep track of different parts of a design problem presented to it. He provided definitions of terms currently in use in the computer design area. And he showed a movie demonstrating techniques involved in the "Sketch-pad" program, as the research is known at MIT.

Mr. Ross pointed out that the program is a means by which man and computer work creatively together in the solution of design problems. The program does not involve design automation; instead, the computer becomes, in effect, a versatile tool for use by the designer.

In current experiments, the designer, using a small penlight, sketches on the face of a glass screen which resembles a television tube. As he sketches freehand, he uses a "keyboard" of controls to evaluate, correct, enlarge, reduce, or duplicate his design via the computer.

The designer can, for example, sketch a rivet on the face of the tube. The design remains traced in light on the tube face; it can be modified, say, to fit an opening sketched in another design already on the tube. The design of the rivet can be "moved"—again by means of the key controls—to be fitted into the opening. Or it can be "turned" on the face of the tube, or viewed three-dimensionally.

The technique, Mr. Ross pointed out, enables the designer to follow through,

from the conception of a design to the design of the final product.

Mr. Ross has been associated with computer research at MIT for the past 10 years. He was associated with the Air Force project which culminated in the APT (Automatically Programmed Tools) Program—currently in use in Development Shops Organization 4200.

## ALO Manager Comments on Fissionable Materials Cut

K. F. Hertford, Manager of the Atomic Energy Commission's Albuquerque Operations Office, released a statement last week in regard to how a planned reduction in production of fissionable materials will affect weapons development and manufacture.

He said, "In his State of the Union address on Jan. 18, the President announced a reduction in production of plutonium and enriched uranium to begin after July 1, 1964.

"We foresee no effect on the supply of fissionable materials required for weapons research, development and testing resulting from the reduced production of plutonium and uranium metal.

"With respect to our weapons manufacturing plants, the modernization, retirement, and new fabrication of weapons will continue. It is not expected that there will be an appreciable effect during Fiscal 1965 (July 1, 1964 through June 30, 1965) on the weapons production plants. However, as an adequate stockpile is reached there will be some adjustments at weapons fabrication plants."

### (Editorial Comment)

## This Is The Year . . .

A friend has written us with suggestions on how to make this year better. Believing that almost any year could well be better than the previous year, we approved of his suggestions and pass them on to you with comment.

The year will be better for our children if we set aside the toys and TV and take some time each day to talk. This sounds like a good idea. We all know our own problems, but do we understand the problems of our youngsters?

The year will be better for our community if we stop standing on the sidelines barking at public officials and pitch in to help correct the things we don't like. Some Sandia employees are setting a high mark for the rest of us in this matter of community service. Some of us are merely barking, not digging.

This year will be better for Sandia, the Atomic Energy Commission, and our country if we work even more effectively and more safely and securely. The benefits will be to many, and of significance to ourselves.

The year will be better for the faltering stranger if we lend a hand. Many of the New Year greetings we heard wished us prosperity. Having plenty in material things is a hollow success unless we share our good fortune with others. Lend that hand; never mind seeking credit; our year will be much richer because of it.

The year will be better for us if we make new friends, read books on new subjects, visit new places, broaden our horizons. How can we help make a better world if we do not first make ourselves better persons?

The year will be better for all of us if we can look back and see progress in our personal life, an improvement in our fellow man. Then come Dec. 31, 1964, we can feel honest satisfaction with the year that was.

## New Type Cloud To Appear Over Barking Sands Site

An experimental system for injecting a glowing cloud into the upper atmosphere will be tested by Sandia Laboratory late this month from Barking Sands rocket launch site in the Hawaiian Islands.

Three Nike-Apache rockets will be used to spread a trail of TMA (an alkyl compound of trimethylaluminum) from 300,000 to 500,000 ft. The liquid TMA will combine with atomic oxygen to produce the light by chemical means. Four camera stations in the Islands will photograph the event and the data will be used to study flow patterns of upper altitude winds. The glowing cloud will be visible at night.

In addition, a fourth rocket will be used to eject both aluminum chaff and a conventional sodium vapor cloud into

the upper atmosphere. This will be an experimental system, since both chaff and sodium have not previously been dispersed from a single rocket. The aluminum chaff will be ejected at 300,000 ft. and tracked by radar as it falls to about 150,000 ft. The sodium will be ejected along the trajectory from 300,000 to 500,000 ft.

The experiments are part of the upper atmosphere research program of Aerospace Physics Division 5414. Lawrence B. Smith of the Division is the scientific director for the project.

TMA was developed by Cambridge Research Laboratories and was used successfully last May and September by the Air Force firing rockets from Eglin AFB in Florida. Mr. Smith and Dale Fastle (7244), who is in charge of the Sandia camera stations in the Hawaiian Islands, observed the September flights.

A system to adopt TMA for Sandia use was developed by H. W. Pumphrey of Aero Design Division 7423. Two canisters of TMA will be carried by each Nike-Apache rocket. One canister will release the liquid TMA as the rocket climbs to apogee and the second canister will release its contents as the rocket falls to earth. The TMA cloud is expected to be much more dense than sodium and to produce a bright glow which can be easily photographed.

Barking Sands launch site is operated by Rocket Projects Division 7431 under J. J. Miller. Alfred A. Young and Lester F. Luehring are the project engineers for the forthcoming launches. E. Randall Parsons will be in charge of rocket assembly.

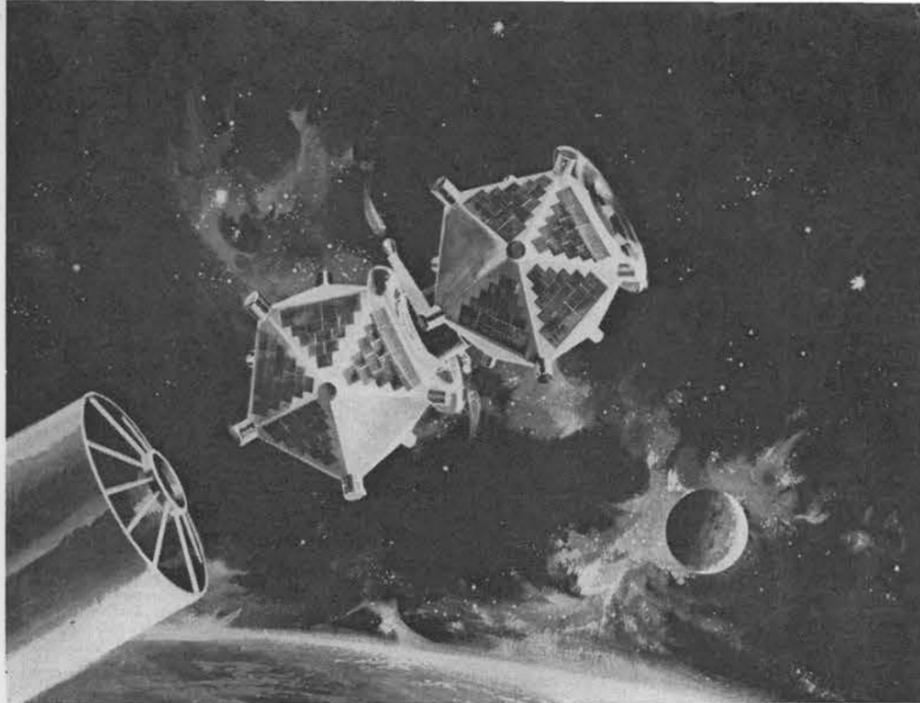
Barking Sands launch complex was used in 1962 during the Johnston Island-Dominic tests. It was reactivated last Spring for Sandia's upper air studies.

### Bldg. 802 Air Conditioning Modification Is Scheduled

The A-One Mechanical Contractors, Inc., of Albuquerque is apparent low bidder on an air conditioning modification project in Bldg. 802, according to the Atomic Energy Commission.

The A-One firm's bid of \$66,633 was the lowest of four received.

T. W. Eglinton (4543-2) is the Plant Engineering Department project engineer.



## DOD Tabs Sandia Satellite Work As 'Outstanding'

"Outstanding in all respects" a recent announcement from the Department of Defense said about the performance of the nuclear test detection research satellites. Sandia Corporation and Los Alamos Scientific Laboratory were complimented for their contributions to the satellites.

The Department of Defense stated: "... the performance of the Advanced Research Projects Agency nuclear test detection research satellites for outer space has been outstanding in all respects.

"The two satellites are performing almost perfectly after two months in orbit. Their reliability has been such that it has not been necessary to use redundant or parallel circuitry, designed for possible malfunctions. The reliability of the two spacecraft is particularly striking in view of the complexity of the satellites. For example, each spacecraft contains 14,000 solar cells and 40,000 electronic components.

"The initial estimate of life expectancy has been revised upward as a result of their successful performance to date. It is anticipated that the satellites will provide data on background radiation and other

### Aspiring Orators Finding Practice in Noontime Viewpoints

"The Free Lance Orators" is the imposing name a group of Sandia Laboratory employees have chosen for their speech group which meets during the noon hour every Thursday in Bldg. 834.

Bob Pace (4422-2), who is the coordinator, explained, "Participants express a viewpoint of their own choice before the members and guests. It's an attempt to help one another in improving oral presentations."

The orators have been meeting for the past six months. The regular membership is about 20 and guests are welcome at the noontime sessions.

There is a different master of ceremonies at each session to introduce the speaker. After the main presentation, the speaker may request a written or verbal critique. And usually there still is time for one-minute extemporaneous talks by each person present or a similar activity.

Recent subjects have included "How to Stop Worrying" by Clem Gragg (1522), "An Oral Interpretation of Literature" by Cim Hoffheins (2563), one of several women members, "Civil Rights — Your Responsibility" by Howard Turner (7433), and "Elixir of Life (Food)" by George Roberts (4422).

Further information about the Free Lance Orators may be obtained from Mr. Pace at 264-1562 or Mr. Turner at 264-3501.

PAGE TWO

LAB NEWS

JANUARY 17, 1964

ARTIST'S VERSION of high altitude nuclear burst detection satellites moments before orbiting in deep space. After separation from the booster (lower left), an on-board rocket fired one spacecraft in circular orbit approximately 60,000 miles from earth. The second spacecraft went through one natural elliptical orbit carrying to about 100 miles from earth. On return to its original apogee, it was fired into an orbit identical to its twin, which has traveled nearly 180 degrees away on the far side of the earth. The two satellites, moving in an orbital period of some 90 hours, are thus like the tips of cosmic baton with the earth as its center. Radiation detection instruments on the satellites were developed by the Los Alamos Scientific Laboratory while Sandia Laboratory contributed the logic systems for transmitting data back to earth. The Department of Defense has termed the systems "outstanding." Sketch is by Space Technology Laboratories, Redondo Beach, Calif., contractor for design and fabrication of the space vehicle.

measurements in space for a total time period of more than six months. The success of this initial launch has moved the research program forward by more than one year.

"The fine performance of these initial detection satellites is due to the excellent teamwork of a highly skilled group which included the Los Alamos Scientific Laboratory and the Sandia Laboratory of the Atomic Energy Commission, the Space Systems Division of the Air Force Systems Command, and a number of contributing industrial contractors."

Los Alamos Scientific Laboratory has been responsible for the design and fabrication of X-ray, gamma ray, and neutron radiation detectors for a satellite-based system of detecting nuclear explosions in space.

Sandia Corporation has been responsible for the design and fabrication of associated data-processing electronics in the satellites together with special equipment on the ground to test the performance of the payloads in the satellites. The Sandia-designed logic system makes it possible to transmit, record, reduce, and analyze only significant data collected by the detectors.

Data from the satellites is recorded by a world-wide network of Air Force ground stations. After collection on magnetic tape, the data is sent to Sandia Laboratory for final reduction.

W. C. Myre, supervisor of Space Projects Division I, 7432, has been project leader for Sandia's development work for the satellites. The effort was centered in Division 7432 with important activities such as manufacturing development, quality assurance, computer programming, and data reduction contributed by many Sandia organizations.

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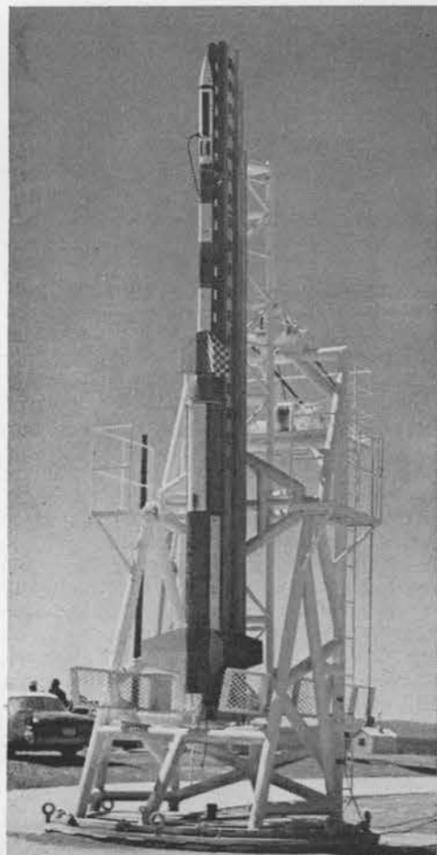
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7



## Service Awards

### 15 Year Pins



Glenn E. Morehouse  
7332  
Jan. 18, 1949



Marcelia Samuelson  
4624  
Jan. 20, 1949



Jack C. McCollum  
4232  
Jan. 24, 1949



Edward J. Newman  
7213  
Jan. 25, 1949



Travis G. Sanders  
4213  
Jan. 25, 1949



A. P. Gruer  
7530  
Jan. 27, 1949



B. O. Shaw  
4542  
Jan. 28, 1949



George E. Farwell  
4412  
Jan. 31, 1949



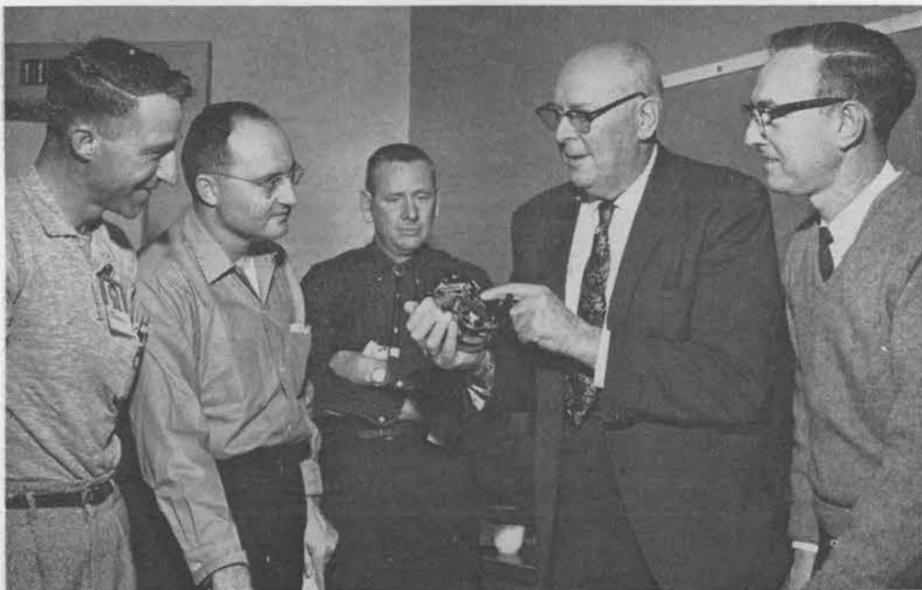
Robert W. Male  
7223  
Jan. 31, 1949



Felix Padilla  
4516  
Jan. 31, 1949



Bill D. Rosebeary  
7221  
Jan. 31, 1949



(Above) FIRE ALARM maintenance was the subject under discussion last week by Fire Prevention, Inspection, Electrical, Maintenance, and Plant Engineering personnel. Al Johanson of the engineering staff of the Gamewell Company, second from right, conducted a class on the subject and spent several days inspecting various fire alarm and detection systems used at Sandia Laboratory. From left are C.K. Rudy (4543), E. L. Schaefer (4543), R. R. Boyd (4542), Mr. Johanson, and R. W. Cohrs (4542) in class.

(Below) APPRECIATION of Sandia Corporation to Military Police of Sandia Base was expressed recently by S. P. Schwartz, Sandia president, when he presented certificates to commanding officers of the two MP companies on the Base. Men of the units are responsible for guiding the thousands of automobiles driven to work by Sandia employees. L to R: Mr. Schwartz; Lt. Col. Roy P. McCrary, Jr., commanding officer of the Sandia Base Military Police; Lt. Daniel J. Beaton, acting commanding officer of MP Hqs. and MP Company B; and Capt. Richard A. Sutton, commanding officer of Military Police Company B.



FINAL ARRANGEMENTS for forthcoming meeting of the Rocky Mountain Region, American Association for Contamination Control, are discussed by (l to r) W. J. Whitfield (2564-2), Dr. John G. Whitcomb of Lovelace Foundation, D. W. Ballard (2564), and R. C. Marsh (2564-2). Dr. Whitcomb and Mr. Ballard will be main tech speakers.

## Take Note . . .

All Harvard alumni are invited to attend the annual dinner meeting of the Harvard Club of New Mexico to be held Saturday, Jan. 25, at the Albuquerque City Club (First National Bank Bldg.).

The social hour will start at 6:30 p.m. with buffet dinner served at 7:30. The after dinner speaker will be William Randolph Lovelace II, M.D., who will give a slide illustrated talk on aerospace medicine. Dancing will follow.

Raymond A. Ledogar (6030) is president of the club.

\* \* \*

The annual meeting for members of the Sandia Laboratory Federal Credit Union will be held Jan. 30 at 5:30 p.m. at the Coronado Club.

Results of the past year will be reviewed; members will be given an opportunity to ask questions or comment on operations; and an election will be held to fill three vacancies on the board. Refreshments will be served after the business meeting.

\* \* \*

Persons interested in learning square dancing are invited to attend a "beginners' dance" as guests of the "Square Up" Club. An adult class which will meet each Wednesday for 18 weeks is now being formed.

The beginners' dance will be held at 8 p.m., Jan. 22 at Fellowship Hall, Christ Methodist Church, 6200 Gibson Boulevard SE. For further information call C. K. Hostetter (2412-1), tel. 256-3803.

\* \* \*

On Jan. 25, the Coronado Club will feature the major social event of the month: a free cocktail party, buffet, and dance for club members.

Cocktails will be served beginning at 7 p.m., and dancing will begin at 8. The buffet will feature sandwiches and salads. Music for the evening will be provided by Sol Chavez and his orchestra.

## Engineering Technician Certification Program Gets Increased Attention

The Institute for Certification of Engineering Technicians will meet jointly with the National Society of Professional Engineers in Chicago, Jan. 25. Purpose of the meeting is to discuss plans for setting up a nation-wide organization for Certified Engineering Technicians.

"A good deal of interest has been expressed in establishing such a national society," Larry Gallo (5312), one of the several certified technicians at Sandia, states.

Since the establishment of the Institute, some 973 Junior Engineering Technicians, Engineering Technicians, and Senior Engineering Technicians have been certified. Because of the necessity of approval by the Board of Professional Engineers in Washington, D. C., and endorsement by two professional engineers, the certification carries considerable prestige.

The Institute was established in 1961 under the sponsorship of the National Society of Professional Engineers. It receives no profit from its certification activities. Individuals seeking further information should call Larry at 255-9129.

## Sandia Speakers on Program Of Contamination Control Meeting to Be Held Here

The second meeting of the Rocky Mountain Region of the American Association for Contamination Control will be held in Albuquerque Jan. 24. Two Sandia Laboratory men are assisting with arrangements; a third will be one of the main speakers.

R. Claude Marsh (2564-2), a director of the national association, and W. J. Whitfield (2564-2) are on the coordinating committee along with James Baechtel of ACF Industries, and Bill Soltis, president, Comfort Air Service, Albuquerque, and vice president of the AACC Rocky Mountain Region.

About 50 persons are expected to attend the meeting, to be held at the Alvarado Hotel. A social hour will start at 6 p.m. with dinner served at 7.

The technical program includes a talk by Dr. John G. Whitcomb, administrative head of surgery, Lovelace Foundation, on "Contamination Control in Medicine," and a talk by D. W. Ballard, supervisor of Sandia's Advanced Manufacturing Development Division 2564, on "Contamination Control in Industry."

The national AACC was organized three years ago and has a membership of between 1500 and 2000. Its purpose is to promote the technology of the control of contamination in closed systems of gases and liquids; to disseminate information on contamination control; and to encourage research and education in this field. Membership is open to all persons having a professional interest in the control of contamination.

## To Read Sandia Papers Before Members of Physical Society

Five Sandians will be presenting technical papers at the American Physical Society meeting in New York City Jan. 22-25. They are:

A. T. Fromhold, Jr. (5151), "Perturbation Analysis of the Effect of Diffusing Space Charge on Rate of Oxide Film Growth."

W. J. O'Sullivan (5151), "Pressure Dependence of the In<sup>115</sup> Nuclear Quadrupole Resonance in Indium." J. E. Schirber (5151) is co-author.

Albert Narath (5151), "Antiferromagnetism in CoCl<sub>2</sub> · 2H<sub>2</sub>O and MnCl<sub>2</sub> · 2H<sub>2</sub>O."

J. E. Schirber (5151), "Search for Pressure-Induced Open Orbits in the Fermi Surface of Cadmium."

D. H. Anderson (5132), "Pressure Dependence of the Co<sup>59</sup> Nuclear Magnetic Resonance in Hexagonal Cobalt." Co-author is G. A. Samara (5132).

PAGE THREE

LAB NEWS

JANUARY 17, 1964

# 8200: Enough Services for a City

(Another in the series of articles describing work of Sandia Corporation's general organizations appears here. It is hoped that these non-technical explanations will help all employees better understand the task undertaken by the Corporation. This article concerns Staff Services, 8200.)



**ACCOUNTING, FINANCIAL AND STORES DIVISION 8213:** Ortno Benson (8213-2) uses calculator for budgeting problem, the major phase of the many accounting and financial functions of this division. Other responsibilities of the division include the issuance and control of stores items, maintaining proper stock levels of materials, records control of all plant inventory except office furniture, control of accountable items, payroll liaison, vouchering, travel disbursements, and disbursement auditing.



**PERSONNEL DIVISION 8212:** Rita Beeman (8232-4) portrays one of many visitors and prospective employees greeted in the lobby of Bldg. 911 by Ruth Bauman (8212-1), personnel receptionist. In addition to recruiting candidates for employment, the division maintains personnel records, coordinates and conducts educational and training programs, assists in wage and salary reviews and labor relations, provides medical and typing pool services, recreation activities, and special services to employees such as the credit union and retirement counseling.

In a way the 8200 organization resembles a small city.

It operates a post office, library, transportation system, medical clinic, guard force, and fire department. It has a power plant, industrial shops, stores, warehouses, a purchasing organization, and recreation facilities. It even has a newspaper.

Heading the 8200 city is C. H. DeSelm, a Manhattan Project and Sandia pioneer. His department heads are E. W. Baldwin (8210), J. L. Rowe (8220), A. D. Pepmueller (8230), and F. R. Moon (8240).

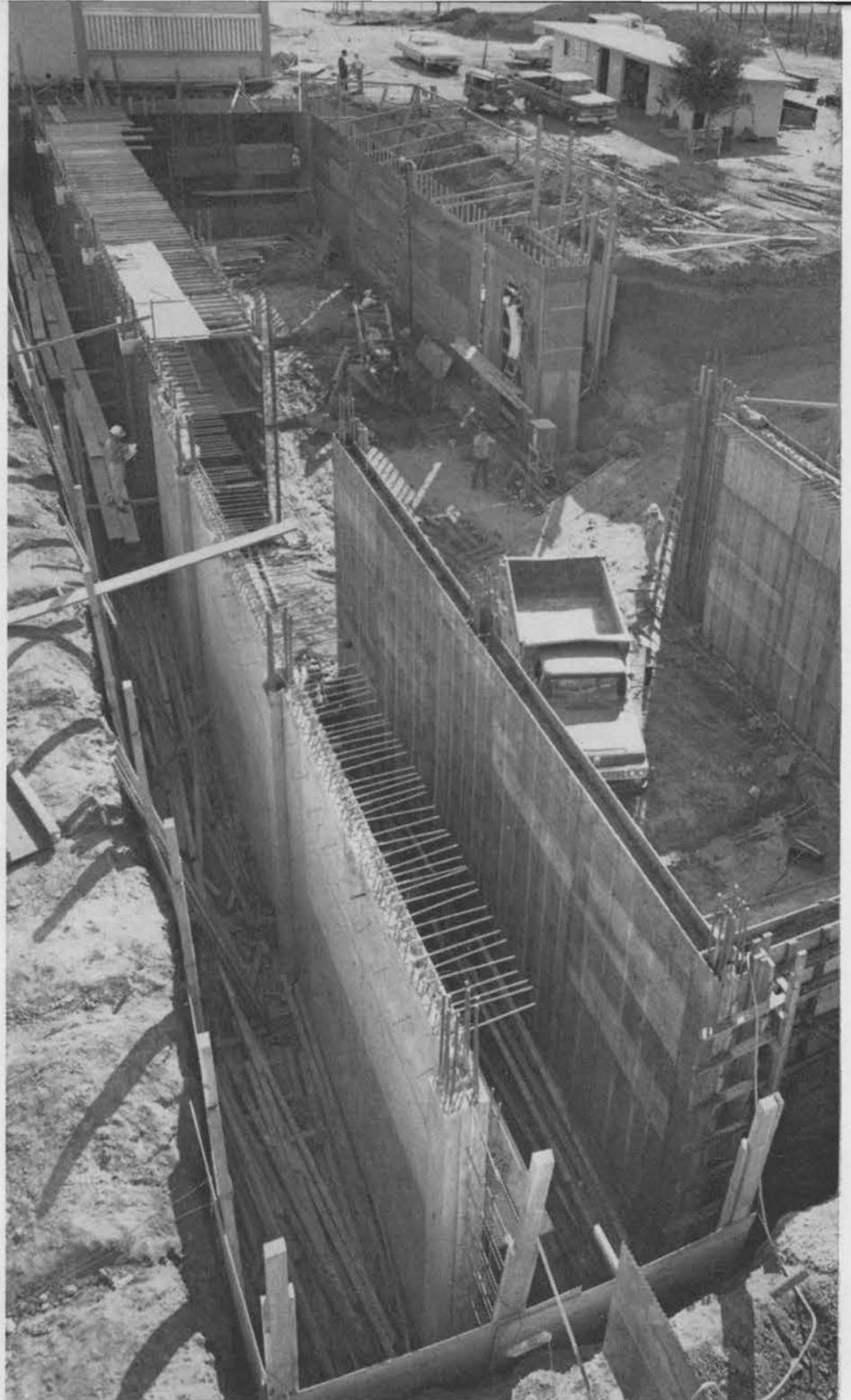
Mr. Baldwin's department, Administrative Services, handles matters pertaining to finance, payroll, personnel, wage administration, records control, shipping, stores, medical services, recreation, secretarial services, and material control.

Mr. Rowe heads the Plant Services Department. The work of his department includes the design, planning, and engineering of buildings, plant maintenance, transportation, power plant, inspection, manufacturing and shop liaison work, and the machine and electronics shops.

Mr. Pepmueller is in charge of the Information, Systems and Procedures Department. Under his supervision is the formulation and development of administrative and technical systems and procedures, the technical library, a high-speed computer system for processing administrative and product definition records, the post office, technical writing, public relations, technical illustration, photography, printing, drawing reproduction, classification, and phone and teletype services. Stories for the city's newspaper, the *Lab News*, are written here.

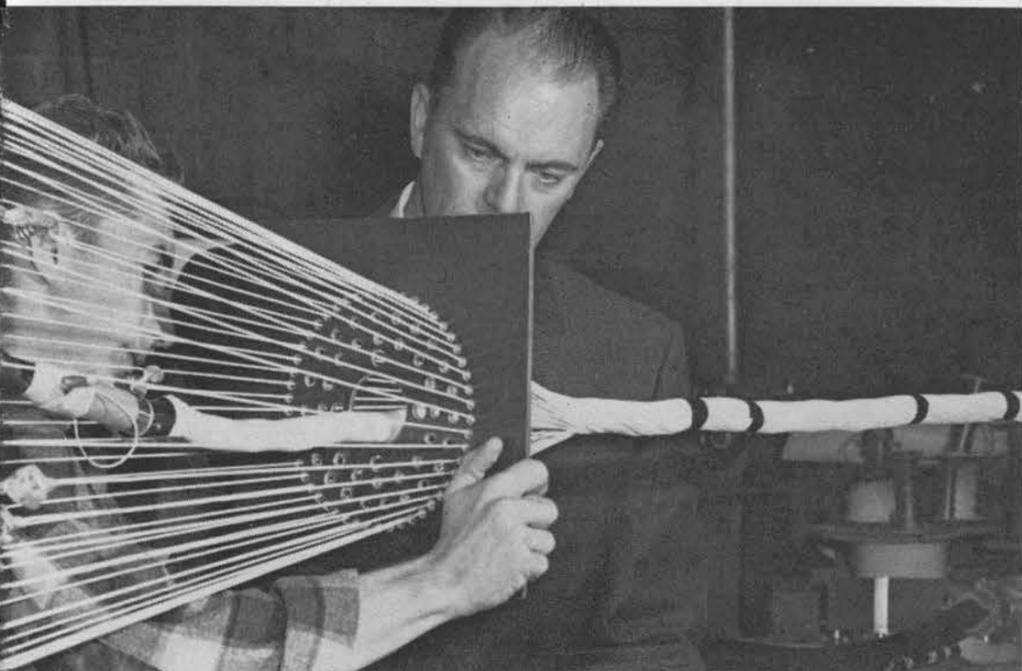
Mr. Moon heads the Security, Safety, and Purchasing Department. All purchasing activities, the guard force, and the health, fire, and safety programs for the city's citizens are administered here. In addition to the regular guard force, an emergency guard force is also trained to assist in times of crisis. Other aspects of this department's job are control of explosives and toxic materials, regulation of classified shipping and mail channels, and travel arrangements and reservations.

Like most cities, the 8200 organization operates day and night, although most of its activities take place during the daylight hours. At night, maintenance crews and shift workers take over to assure security and a smooth running operation the following day.



**PLANT ENGINEERING DIVISION 8221:** New wing on the Engineering Building (912) is representative of the work of this division. On this project, as well as all others at Livermore Laboratory, the division initiates plans and specifications, including design criteria. Layout requirements pertaining to office, mock-up, or construction, or any specific installation of equipment are also controlled through this division. The division also initiates and maintains plant engineering standards, administers utility services, designs plant facilities and installations, and coordinates the work of outside construction contractors.

**PURCHASING DIVISION 8243:** Supplier Relations office maintained by the division provides liaison between supplier's representatives and Laboratory organizations. June Tomsic (8243-4) serves as receptionist. All materials or assemblies from commercial suppliers needed by the Laboratory are purchased through this division; sub-contracts are let, and traffic problems concerning personnel and materials are handled. The division also surveys potential suppliers of products and services, and continually explores new processes and ideas for use in weapons program.



**MANUFACTURING AND SHOP LIAISON DIVISION 8226:** Bob Chappell (8226-1) offers advice to outside supplier on special manufacturing problem. The division coordinates manufacture between engineering organizations and Livermore Laboratory shops or outside suppliers. It also surveys technical aspects of existing and potential suppliers and suggests possible sources to the purchasing organization.



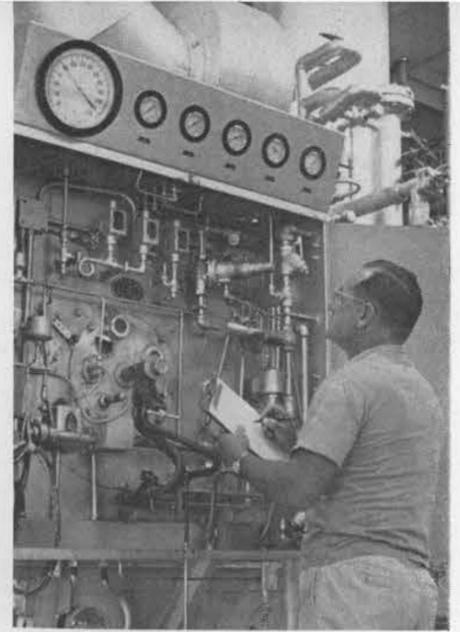
**INFORMATION DIVISION I, 8232:** Photographer George Hosoda (8233-3) performed some optical sleight-of-hand to make this picture showing bookshelves in the technical library reading room symbolically reflected in an eyeglass. The shelves represent the more than 25,000 technical reports, hundreds of periodicals, and over 6,000 books available to employees. This division is also responsible for the classification function, central accountability for Laboratory documents, mail and messenger service, three filmbanks, drawing reproduction, and the Laboratory communications systems.



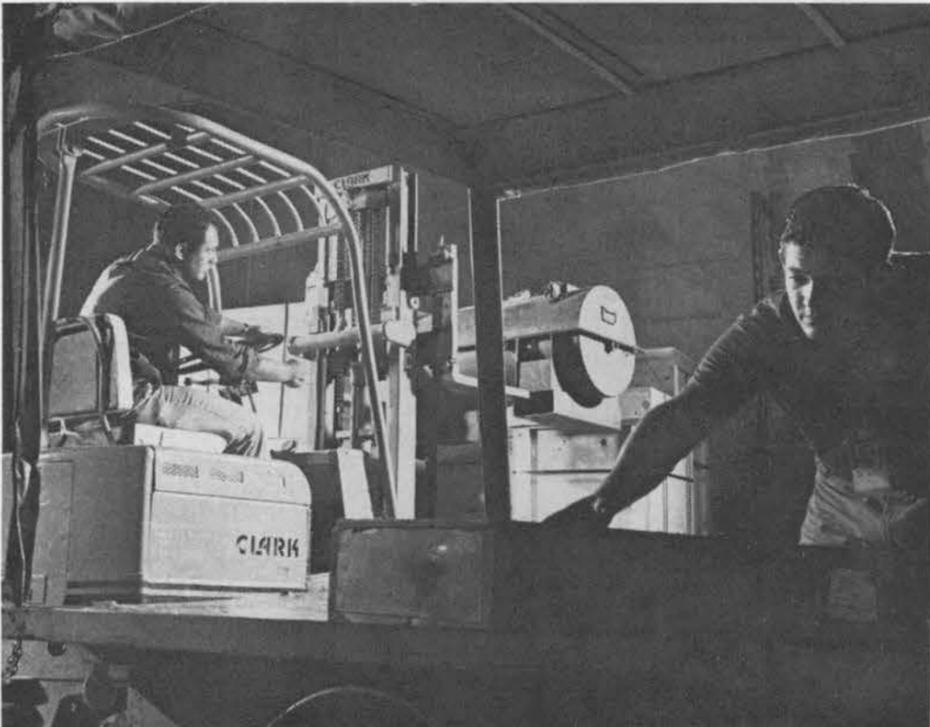
**SAFETY ENGINEERING AND ENVIRONMENTAL HEALTH DIVISION 8242:** Ray Campbell (8242-2), right, conducts test with air sampling device to determine amount of dust in air surrounding C. J. Tillman (8223-1) while machining material on lathe. Industrial hygiene, health physics, industrial accident prevention, fire prevention activities, and control of explosives, toxic, flammable, radioactive and special materials are also part of this division's job.



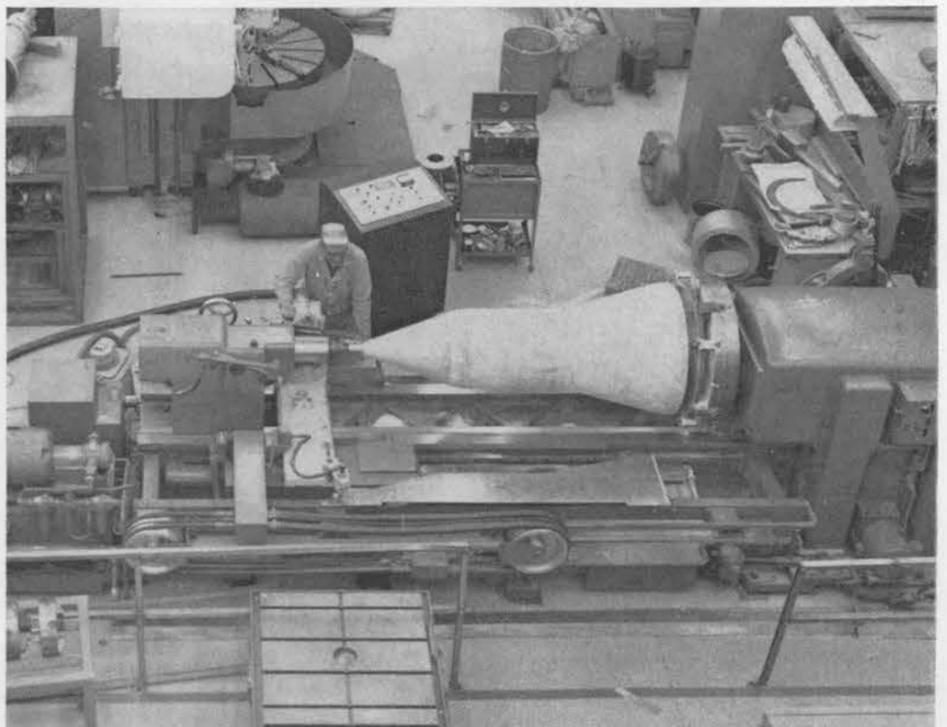
**SYSTEMS, PROCEDURES AND DATA PROCESSING DIVISION 8231:** Barbara Whitlow (8231) poses with an Engineering Manual, a stack of SCI's, and computer equipment — representing the three major functions of this division. The division prepares Livermore Laboratory SCI's, and analyzes, develops and installs technical and administrative management systems as required by management policy. Many of the systems are programmed for computers and revised as needed to keep pace with technical and administrative advances.



**PLANT MAINTENANCE DIVISION 8222:** Boiler readings are taken at the steam plant, Bldg. 915, by Earl Deno (8222-1) to assure proper operating temperatures and pressures. This division operates heating and air conditioning equipment, and a fleet of cars, trucks, and heavy-duty maintenance equipment. Other services include gardening and landscaping, limited water treatment, plant clean-up, locksmithing, specialized maintenance and repair, painting, and movement of materials within the Laboratory.

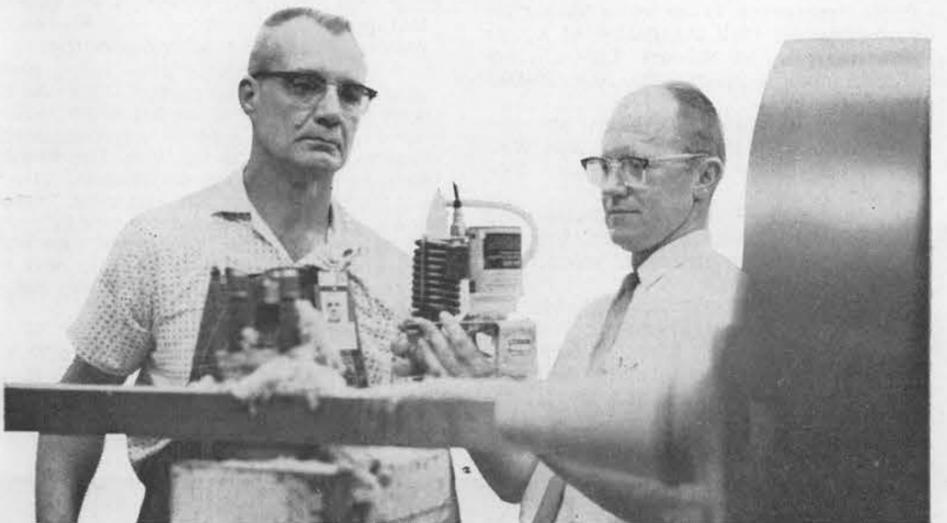
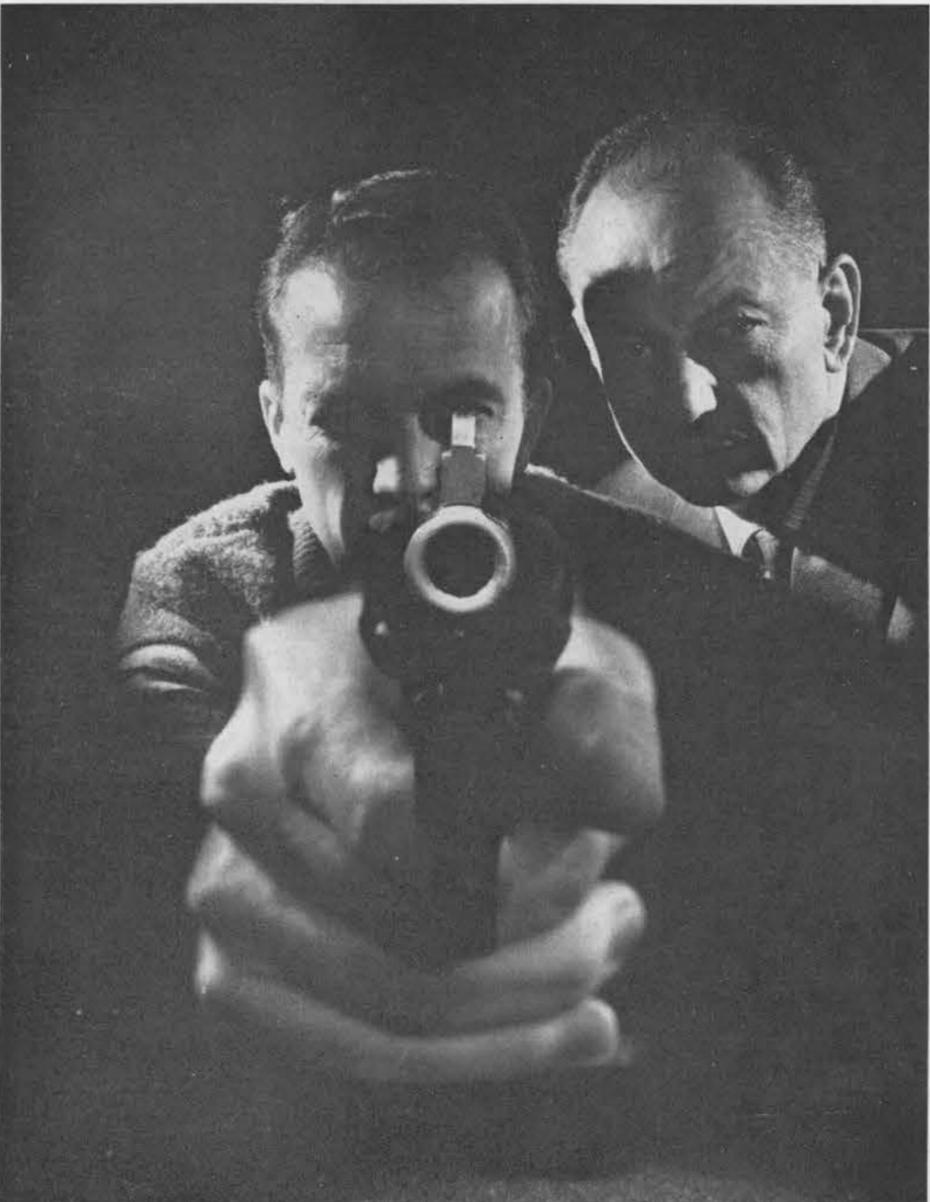


**SHIPPING, RECEIVING AND MATERIAL CONTROL DIVISION 8214:** Don Giusti, operating fork lift, and Joe Ruiz, both of 8214-1, load materials on electric truck for delivery to engineering organizations. The division handles everything that is received or shipped to or from Livermore Laboratory, stores unused equipment and materials, processes all material slated for reclamation, and is responsible for procurement and control of all office furniture.



**MODEL SHOP DIVISION 8223:** Skilled craftsmen like M. K. Turpin (8223-1), shown here, perform complex bench and machine work with modern machinery, some numerically-controlled, in this division. Complete shop facilities are available for welding, sheet metal assembly, and plating. Both standard and contour operations can be performed. A contaminants shop is maintained for machining toxic materials.

**SECURITY ADMINISTRATION AND OPERATIONS DIVISION 8241:** Don LeLancon (8221-1) aims pistol under the direction of Ray Raty (8241-1) during training session for supplemental guard force established to assist contract or guard force in emergencies. The guard force is one of the division's chief responsibilities. Other responsibilities include the badge system, visitor control, security education programs, security measures for movement of classified materials, and classified mail and shipping channels.



**INSPECTION AND ELECTRONIC FABRICATION DIVISION 8225:** Helmuth Woidtke and Alex Alexander, both of 8225-2, inspect experimental part for close tolerances. The division is also responsible for electrical inspection, fabricating printed circuit boards, transformers, toroidal coils, telemetry items, test devices, and components for fuzing, firing, and other control functions.



**INFORMATION DIVISION II, 8233:** Grouped around light table in the print shop are, l to r, technical writer Hal Wright (8233-1), technical illustrator Ubbie Hammer (8233-2), and photographer George Hosoda (8233-3). Behind them is printer Don Aydelott (8233-2). They represent four services offered by the division. Other work includes patent liaison, employee and management bulletins, and public relations activities.

*Pictures on these pages depict in part some of the wide variety of services performed by 8200 staff*

## Sandia Speakers

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

L. S. Nelson and N. L. Richardson (both 5414), "Explosive Oxidation of Freely Falling Zirconium Droplets Initiated by Flash Heating," 146th National Meeting of the American Chemical Society, Jan. 19-24, Denver, Colo. Mr. Nelson will make the presentation.

P. B. Bailey (5421), "Bohr's Quantization Rule," American Mathematical Society, Jan. 23-27, Miami, Fla.

M. S. Tierney (5422), Paul Waltman (5421), and G. M. Wing (5421), "On Some Problems in the Optical Design of Shields and Reflectors in Particle and Wave Physics," American Mathematical Society, Jan. 23-27, Miami, Fla. Mr. Waltman will make the presentation.

W. A. Gardner (7300), "Quest for Quality," Albuquerque Kiwanis Club, Nov. 13.

O. M. Stuetzer (5136), "Ionic Space Charges and Their Applications," Electron Devices Group of the Institute of Electrical and Electronics Engineers, Albuquerque Section, Oct. 24.

P. E. Waltman (5421), "Some Properties of Solutions of the Lane Emden Equation," Department of Mathematics, University of New Mexico, Nov. 26, Albuquerque.

J. W. Easley (5300), "Radiation Damage Research at Sandia Laboratory," Department of Nuclear Engineering and Science Seminar, Rensselaer Polytechnic Institute, Nov. 21, Troy, N. Y.

F. A. Goss, Jr. (1312), "Ignition Temperature of Lead Styphnate As a Function of Rate of Energy Input," 12th Contractors' Conference of the Basic Research Laboratory USAERDL, Nov. 6-8, Ft. Belvoir, Va. The presentation was made by one of the co-authors from Aerojet-General Corporation.

Nicholas J. De Lollis (1112-3), "Problem Areas in Bonding Plastics," Industrial Adhesives for Metal and Plastics, Jan. 30-31, Madison, Wis.

E. S. Roth (2564-1), "Optical Inspection of Constant Form Elements," ASTM Precision Measurement of Cylindrical Surface Elements Seminar, Jan. 14-15, Hartford, Conn.

L. B. Smith (5414), "Measurement of Atmospheric Pressure Between 95 and 130-km Using Cold-Cathode Ionization Gages," Conference on Structures of the Stratosphere and Mesosphere, Nov. 19-21, El Paso, Tex.

L. J. Vortman (5412), "Effectiveness of Three Approaches to Spending Money for Sheltering the Civil Population of a City with an Adjacent Military Target," New Mexico Medical Symposium, Nov. 30-Dec. 1, Albuquerque.

W. C. Kraft (2450), "Technical Management Without Priorities," IEEE Mid-Winter Military Electronics Conference, Feb. 5-7, Los Angeles.

C. J. McGarr (4600), "Management Science in An Inventory Control System," Civil Service Administration group, Jan. 23, Washington, D.C.

J. O. Wear (5153), "The Chloride Dependence of the U(IV)-Ti(III) Reaction in Aqueous Solutions," Division of Physical Chemistry, 146th National American Chemical Society meeting, Jan. 19-24, Denver, Colo.



B. C. Caskey

## Seven Years Work Earns Bill Caskey PhD in Scouting

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

For adult leaders, the Wood Badge is the "PhD of Scouting." For Bill C. Caskey (1513), who completed the requirements for the award last month, it climaxes seven years of volunteer service with the Boy Scouts of America.

Bill has been assistant scoutmaster, scoutmaster, and training officer with the Manzano District ever since coming to Albuquerque in 1956. He is still leader of Troop 4 and leads weekly meetings. In addition, he periodically teaches classes of new Scoutmasters in the methods and skills of leading Scout Troops.

To qualify for the Wood Badge, Bill completed a three-part program. The first part consisted of an eight-day encampment in the field with intensive training in the mechanics of leading Scout troops on camping trips, nature studies, and Scouting skills.

Second part of the qualifying consisted of an 80-page "thesis" in which Bill described Scouting philosophies and ideals. He planned an entire year's schedule of scouting activities, and made detailed plans for an eight-day Scout camping trip.

Third requirement for the Wood Badge was that of giving service to the Scouts. Bill qualified for this part with his Scoutmaster duties and teaching activities.

Working with Scouts gives Bill a great deal of personal satisfaction. "It's always a thrill," he says, "to see immature youngsters of 11 or so grow into self-confident leaders of other boys. With the Scout's emphasis on character development, physical fitness, and citizenship training, I think it's a great organization for youth."

"My own sons," Bill continues, "are only six and four years old but they will be Scouts. And I'll be a Scoutmaster for a long time yet."

Other Sandians who hold the Wood Badge include A. E. Bentz (7413), W. C. Clark (4431), R. D. Brooks (2331), R. E. Brian (2633), G. A. Fowler (7000), and H. W. Maglidt (3460).

## 19th Century Physicists Prove Mendeleev Atomic Theory

(Editor's Note) By illustrating the periodicity of the elements, Mendeleev provided some support for the theory that all matter is ultimately made up of atoms. However, if information could be obtained from several sources concerning the size and actual weights of atoms, a general agreement among the results might provide a really convincing argument that atoms exist. In this issue, we will examine the work of several scientists whose findings corroborated the atomic theory.

The first fairly accurate estimate of molecular size was published in 1816 by the English physician and physicist Thomas Young: "Within certain limits of accuracy, we may obtain something like a conjectural estimate of the mutual distance of the particles of vapours . . . as supposed to be nearly in contact with each other; for if the distance, at which the force of cohesion begins, is constant at the same temperature, and if the particles of steam are condensed when they approach within this distance, it follows that at 60 degrees of Fahrenheit the distance of particles of pure aqueous vapor is about the 20 millionth of an inch."

From this result, and from a comparison of the densities of liquid and vapor, Young concluded that the diameter of a water molecule must be about a billionth of an inch.

Scientists of Young's time explained the pressure exerted by gases by assuming that the molecules of a gas are constantly in motion, striking each other and the walls of their containing vessel, and continually changing direction. Using this theory, called the kinetic theory of gases, the Englishman J. C. Maxwell and others were able to derive a number of equations, one of which showed how the viscosity of a gas depends on the size of its molecules and the number present in a unit volume.

However, since neither the size of molecules, nor the number present in a unit volume were known at the time, no conclusions could be made, since a single equation with two unknowns can't be solved.

In 1865 the German scientist Loschmidt pointed out that if molecules were regarded as spheres, and if, in the liquid state, these spheres were packed as closely as possible, another equation could be applied, relating these same two quantities to the density of the liquid. Thus, if the viscosity of a particular gas and the density of the liquid which is formed when the gas is cooled and compressed are known, the two equations permit calculation of the size of a given molecule and the number present in a given volume.

Loschmidt found that the molecules of nitrogen, oxygen, and carbon dioxide are slightly more than one ten-millionth of a centimeter in diameter — a measurement now known to be about five times too large.

In 1870, a Scottish physicist, William Thomson (who later became Lord Kelvin) reviewed the various methods devised for determining molecular size. Thomson attained recognition as one of the greatest physicists of his time, and provided suggestions out of which advanced research grew.

He concluded that the methods for determining molecular size all led to values of the same general size: about 10<sup>-8</sup> centimeter for the diameter of a molecule. In a lecture delivered in London in 1881, he tried to convey some idea of the sizes of atoms and molecules to members of the Royal Institution: "To determine some conception (of molecular size) imagine a globe of water as large as a (spherical) football . . . say 16 centimeters in diameter, to be magnified up to the size of the earth, each constituent molecule being magnified in the same proportion. The magnified structure would be more coarse-grained than a head of small shot but probably less coarse-grained than a heap of footballs."

There was a major—and final—attack on the kinetic-molecular theory between 1890 and 1908, during a period when theories about thermodynamics (dynamics of heat), were being extensively applied. Wilhelm Ostwald and his "Energetics School" attacked the molecular theory on the grounds that particles whose existence had never been demonstrated were involved. From Ostwald's point of view, any discussion of detailed mechanisms was needless and even undesirable. In the view of the Energetics School, the statement

of thermodynamic relations describing processes or chemical reactions was a primary goal.

The attacks on Ostwald were halted in 1908 by the brilliant experiments of Jean Perrin, a French physicist, on the "Brownian motion" of particles large enough to be seen by means of a microscope. The observed behavior of the particles agreed quantitatively with predictions based on the kinetic-molecular theory.

Some years earlier, the English botanist Robert Brown had observed that microscopic pollen grains suspended in water move continually and at random in all directions. The motion, attributed to the continuous bombardment of the particles by molecules of the medium in which they are suspended, represents, on a magnified scale, the motion of the invisible molecules surrounding the particles.

Perrin measured the various types of suspended particles. By assuming that they behaved like the molecules which moved them, and which, in turn, were assumed to obey the laws of kinetic theory, he was able to calculate the Avogadro number — the number of molecules present in the molecular weight of the substance expressed in grams.

In other experiments on the motion of suspended particles, Perrin made use of an equation first derived by Albert Einstein in 1905. By combining this with other equations, he obtained further data which enabled him to estimate the number of molecules contained in a given volume of gas. His findings confirmed those of other researchers using more sophisticated methods: the Avogadro number was always more or less the same; 6x10<sup>23</sup>, regardless of the type of experiment on which it was based.

## Sandia Authors

Current or forthcoming articles by Sandia authors in technical journals include the following:

J. M. Holovka (1111), "Apparatus for Determining Weight Loss in an Inert Atmosphere," January issue, *Analytical Chemistry*.

F. J. Wymer (7223), "Fast Intensity Rise Light Source," December 1963 issue, Note Section, *Review of Scientific Instruments*.

C. R. Clark and W. J. Zimmer (both 1442), "The Interpretation of AOQ," January issue, *Industrial Quality Control*.

G. W. McClure (5152), "Double Electron Capture by Protons in H<sub>2</sub> Gas," Nov. 15, 1963, issue, *Physical Review*.

A. T. Fromhold, Jr. (5151), "Kinetics of Oxide Film Growth on Metal Crystals. II. Homogeneous Field Approximations," November 1963 issue, *Journal of Physics and Chemistry of Solids*.

Albert Narath (5151), "Chlorine Nuclear Quadrupole Resonance in Paramagnetic FeCl<sub>3</sub>," Feb. 15 issue, *Journal of Chemical Physics*.

D. B. Owen (5425) and D. L. Hanson, University of Missouri (formerly of Sandia), "Distribution-Free Tolerance Limits—Elimination of the Requirement That Cumulative Distribution Functions Be Continuous," November 1963 issue, *Technometrics*.



AMERICAN WELDING SOCIETY PRESIDENT Clarence E. Jackson, left, visited Sandia Laboratory last week. Shown with him at the Sphere of Science are (continuing from left) C. A. Corbin (4224), second vice chairman, AWS Albuquerque Section; Fred L. Plummer, national AWS executive director; Gabe Beatrice (4413), chairman, AWS Albuquerque Section, and S. C. Waldorf (4224), publicity chairman, local AWS. Mr. Jackson, Associate Development Manager, Electric Welding Department, Linde Division of Union Carbide, spoke at a meeting Jan. 9.

# Syracuse U. Industrial Engineering Head To Speak on Education, Industry Needs

Bert H. Norem, chairman of the Department of Industrial Engineering of Syracuse University, will be featured speaker at a meeting of the New Mexico Area Chapter of the American Institute of Industrial Engineers Jan. 21. He will speak on "Industrial Engineering Education and Industry Needs."

The meeting will be held at Lobo Joe's Restaurant beginning at 6:45 p.m. with a buffet dinner. Technical program starts at 8 p.m.

Professor Norem will discuss history, objectives, distinctive features, and future needs of industrial engineering education. He will describe education opportunities necessary to maintain a high level of competence by practicing engineers. He will also discuss the progress of new cooperative graduate programs sponsored by the state of New York and industry.

The speaker has had industrial experience with Taylor Forge and Pipe Works, Sears Roebuck and Company, and Carrier Corporation. He has served on the Industrial Engineering staff of Syracuse University since 1943 and has been chairman of the Department since 1952. He has served as a Fulbright lecturer in Denmark and Norway, as consultant for the

United Nations in the Far East, and as an educator on manufacturing processes in Mexico.

Those interested in attending the meeting are invited to make reservations by contacting Dave Poli (2542-2), ext. 264-7557 by Jan. 20.

## Table Tennis Eliminations Started at Sandia Laboratory

Joaquin E. Chavez (2625) heads the Sandia Laboratory Table Tennis Association for a second term as president. He was elected last week with Tom C. Garcia (4631), vice president, and rules committee members Dennis S. Chavez (2642), Bennie M. Garcia (4611), and Jarvis G. Bumgarner (2331).

Singles and doubles eliminations are currently underway in general organizational competitions. Winners and runnersup from organizational contests will go into the finals for the Laboratory championships.

Singles tournament will be held Mar. 2 and Doubles finals will be held Apr. 6.

All Sandia Laboratory employees are eligible for league play. About 2000 players are currently enjoying the noon time activity. To enter organizational tournaments, contact your Recreation Council representative or call ext. 264-2757.

## 15 Sandia Lab People To Teach Tech Writing At U. of New Mexico

The Albuquerque Chapter of the Society of Technical Writers and Publishers announces its second University of New Mexico Community College course on the types and techniques of technical writing in New Mexico.

The course will be offered during the spring semester at UNM starting Feb. 5. The class will meet on Wednesday evenings at 7 for 12 two-hour sessions, each one presented by a different authority discussing various technical communication specialties. Of the 17 instructors for the class, 15 are Sandia Laboratory employees. All are members of STWP.

Some of the topics to be discussed are editor and writer qualifications and responsibilities, manual writing techniques, military publications, training film script writing, proposals and brochures, technical illustrating, and writing for teaching machines.

STWP coordinator for the course is R. P. Lewis (2322) who will also make one of the course presentations. Other Sandians who will participate include D. H. Emrick (2322), Don Benoist (2322), V. E. Gibbs (2322), A. P. Lites (2321), C. A. Tucker (4413), Jean La Paz (2111), P. C. House (3463), C. S. Johnson (2313), H. W. Young (2624), G. J. Hurley (2323), W. F. Carstens (3420), R. F. Utter (3132), J. M. Stuckey (2322), and G. C. Holloway (2320).

No prerequisites are required for the course. Enrollment is by regular UNM Community College procedures. Fee for the course is \$15.

PAGE SEVEN  
LAB NEWS  
JANUARY 17, 1964

## Sandia Engineers to Teach UNM Courses

Two Industrial Engineering courses will be taught at the University of New Mexico next semester by Sandia Laboratory engineers. R. W. Berger (2561) will teach ME 150, Engineering Economy, on Mondays and Wednesdays, 4:30 to 5:45 p.m. for three hours undergraduate credit. W. D. Jones (2561) will teach ME 156, Industrial Management, on Tuesdays and Thursdays, from 4:30 to 5:30 p.m. for two hours undergraduate credit.

The ME 150 is a new course being offered in response to interest by Sandia personnel. Numerous techniques will be developed to aid in making capital budgeting decisions, such as breakeven charts, cost-effectiveness models, replacement models and inventory models. The course will also be devoted to methods of computing compound interest and depreciation, the effect of income taxes, and the effect of sources of investment funds. Each student will have the opportunity to apply some aspect of engineering economy theory to a project in his area of interest.

ME 156, Industrial Engineering, is a regularly-offered course. It covers principles of management applied to the general operation of engineering projects and manufacturing plants. Students must have senior standing or permission of the instructor to take the course.

### 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

- '61 1/2-ton CHEV. pickup, 4-speed, Positraction, 6-ply tires, camping cover. Prekker, 299-6468.
- GERMAN LUGERS: selling my collection of fine Lugers, \$65 and up, according to best reasonable offer. Smitha, 299-1096.
- '59 METROPOLITAN COUPE, R&H, \$450. Jackson, 255-8142.
- '57 MERCURY, hardtop, automatic, new tires, 55,000 actual miles, \$450. Loeper, AM 5-0472.
- GAS RANGE; electric refrigerator, wheel barrow; 45" cotton mattress; shovel; 2 camping boxes; lawn tools. Letbetter, 256-1242.
- '60 FIAT, 4-dr., wsw tires, R&H, \$450. Shepherd, 3001 Vermont NE, 299-9066.
- HEATHKIT MONAURAL Hi Fi components; 50-watt amplifier, completed but never used; pre-amp and AM-FM tuner kits in original cartons, cost \$190, first \$100 takes all. Arthur, AX 9-7044.
- MOBILE POWER SUPPLY, new DM-35 dynamotor (12 vac input—600 vdr @ 225 ma output); Mallory vibrapack on chassis w/rays, circuit-breaker, all connectors, \$25. Cope, 298-1674.
- UPRIGHT PIANO, \$200 or will trade for equivalent value in tape recording equipment. Breitenbach, 268-7900.
- '61 JEEP FC170, 1 ton, flat bed, wood, 7'x10'; Timpte stake w/fold-down cattle racks, 9'x6'x8', 17,000 miles, new hubs. Martin, 255-6946 after 6 p.m.
- THREE 8-HOLE 3/4-ton truck wheels for Ford or Chev. 17.5" tires, \$5 each. Souder, BU 2-3121.
- MOSSMAN 3-BDR, 1 1/4 bath, den, fireplace, double garage, walled, built-ins, ww carpets, drapes, a/c, \$1500 down. Bushmire, AL 6-7321 after 5:30 p.m.
- '62 FORD PICKUP, \$1250; '55 Rambler, \$250. Justice, 877-3504.
- 20" GIRL'S bicycle, \$17; Hi-Fi cabinet, \$14; sable oak dining set, \$49. Winblad, DI 4-3109.
- '56 OLDS 4-dr., radio, auto. trans., new shocks. Madsen, AX 9-4712.
- COSCO NYLON NET PLAY PEN, \$12; Sears 20" rotary mower w/catcher, safety clutch, and impulse starter, \$45. Souther, 299-2964.
- TWO MATCHING STEP TABLES, limed oak finish, \$15 ea. or both for \$25. Bear, 298-2744.
- 36" GAS RANGE, \$15. Krenz, 298-0619 after 5 p.m.
- 3-ROOM HOUSE, lot, 55x166, hot and cold running water, \$3500, located 1309 Neetsie Drive SW. Baldonado, 1406 Bridge SW after 5 p.m.
- FIVE-PIECE YELLOW DINETTE SET, \$30; 7-piece dining set, hardwood, table w/10" leaf, 4 side chairs, 2 arm chairs, thick padded seats, \$55. Trujillo, 265-4192.

- 1932 MODEL B FORD pickup, make offer. Young, 837 Valencia Dr. SE, 255-8193 after 5:30 p.m.
- '56 FORD TUDOR, low mileage. Finley, 344-4374.
- 26" BOY'S bicycle, AMF Roadmaster Saturn, chrome fenders, w/w tires, light, fender handle bars, \$25. Seeley, 298-2402.
- DACHSHUND PUPS, 6 weeks old, male, black and tan; female, black and tan; female, red; litter is AKC registered. Caudell, 299-0646.
- LARGE DOG HOUSE, electrically heated, thermostat control. Hill, CH 3-3493.
- FULL-SIZED MATTRESS and box springs w/legs, \$20; 17" table model TV, \$25. Lowe, 11404 Bellamah NE, 299-7725.
- PIANO, Story Clarke spinet. Lloyd, AX 9-5170.
- MOSLEY CM-1 receiver, \$98; Heathkit DX-20, \$55; Swan 240, \$272; Heath HP-10 12-volt supply, \$35. Hansen, 344-8985.
- STORY CLARKE console piano, about 3 yrs. old, \$750. Young, 256-9158.
- 5 TO 40 ACRES, Frost Road five miles east of Hiway 10N, 2 wells, Co-op electricity. Poe, 268-1984 after 5 p.m.
- 2 PR. 7' SKIS, safety bindings, 2 pr. boots, ladies 6, mens 10, all for \$20, solid maple crib w/mattress, maple youth bed w/mattress, \$22 ea., \$40 both. Johnson, 298-1011.
- TINY TOY POODLE puppies, AKC registered, pedigree, \$125, terms. McFarland, 299-7517.
- '50 CHEVROLET, new battery, \$95. Benjamin, 299-5134.
- ANTIQUA ORGAN, plays, has been re-finished; reloading press, H type w/mounting bases and priming posts. Westfahl, 298-4716.
- '49 PONTIAC Club Coupe, R&H, \$75. Mauldin, 298-3164 after 6 p.m.
- WINGBACK CHAIR, new, colorful, Early American, \$40 or will trade for used electric clothes dryer in good condition. Reilly, 298-7118.
- '58 FORD Ranchero, R&H, must sell, \$495. Little, 298-6462.
- '58 IMPALA HT, PS, AT, 7 w/w tires, snow tires, original owner, R&H. Selph, AX 9-6833, 877-3651 evenings and weekends.
- '54 CADILLAC 4-dr., R&H, almost new w/w, engine needs work, \$375, no trades; 16 mm magazine camera, F1.5, \$45. Hueter, 242-1620.
- HOUSECOAT, tailor-made, full-length, egg-shell-beige corduroy, size 14, will hem to length, \$10. Frauenglass, 345-0119.
- '61 CHEV. convertible, red w/black top, PS, PB, Powerglide, will accept older car or truck as trade. Konnick, 268-6409.
- '58 PONTIAC Chieftan, standard shift, R&H, one owner, 2-tone blue, \$995. Johnson, 255-5817 after 5:30 p.m.
- BLOND OAK DINING TABLE w/6 chairs, table 40x60" w/2 12" leaves. Williams, 298-4602. after 5:30 p.m.
- '62 FORD GALAXIE 500, V-8, 2-dr. sedan, all vinyl interior, Cruise-o-matic, radio, PS, padded dash-visors, seat belts, 13,500 miles, \$1995. Williams, 298-6501.
- TRUCK WHEEL, 8-hole w/new retread 7:17.5 six ply nylon tire mounted, \$30. Allen, 243-7085.
- '61 NEW MOON MOBILE HOME, 57x10', 2-bdr., front kitchen, large large carpeted LR. Schulze, 242-8388.

#### NEXT DEADLINE FOR SHOPPING CENTER ADS Friday Noon, Jan. 24

- 35MM CAMERA, F2.8, Regula Gypsy w/-case, \$20; 30-06 Springfield rifle, \$40. Bland, 268-4913.
- '59 FORD Ranch Wagon, 2-dr., V-8, OD, R&H, \$500. Suber, 298-3029.
- '54 FORD 6, \$100. Hansen, 298-0436.
- SKI PANTS, White Stag stretch, size 10, Tiny checks in black and white, worn only few times, now out-grown, \$7.50. DeVore, 255-7211.
- '62 GREAT LAKES MOBILE HOME, 55'x 10' w/18' extendo living room, carpeted, all gas, storm windows, fence, \$4000. Henneke, 298-4232.
- SELL OR TRADE: .303 Enfield and ammo for best cash offer or proof sets, un-circulated rolls, early Mercury-Roosevelt dimes. Wemple, 298-2048.
- BED, bookcase headboard, double size, springs and mattress included, \$50 or best offer. Thorp, 298-6030.
- DOG, male, 1 yr. old, half Bassett hound, good watchdog, likes children, free. Schuster, 299-1072.
- LARGE KITCHEN TABLE, w/extra leaf, 4 chairs, blue, \$20. Steele, 299-9117.
- ARGUS C-4 camera w/flash; 6 meter transceiver, grid Dip meter; lab type power supply; misc. ham junk. Stephenson, AX 9-3914.
- '57 FORD Fairlane 500, T-bird engine, radio, automatic transmission, PS, \$351, (loan value \$300). Chavez, 299-5102.
- 3-BDR., DEN, or 4-bdr Mankin, walled, landscaped, w/w carpet, built-in range, cent. heat, \$12,950, new FHA \$600 dn., 1506 Erbbe NE. Farner, 299-6007.
- TWO LOTS near Juan Tabo & Indian School Rd., restricted, near utilities, no broker fees, terms available. Collins, 268-3612.
- ARMY SLEEPING BAG, new lining, \$2.50; men's and boy's complete winter and summer scout uniforms; sheep-lined leather pants, \$5. Costello, 256-9702 after 6 p.m.
- '55 MERCURY, 4-dr., automatic, R&H, best offer. Downs, 268-5896.
- BED FRAMES, deluxe set for king-size bed, still in factory carton, \$10. Everett, 298-3994.
- '58 CADILLAC, 4-dr., all power, seat belts, new tires, low mileage. Hare, 299-7137 after 5:30 p.m.
- '60 AUSTIN HEALY SPRITE, R&H, white w/red leather interior. Seay, 268-9124 after Jan. 19.
- ROBERSON 4-br., LR, den, library, separate dining rm, kitchen built-ins, 2 1/2 baths, 2200 sq. ft. area, Paradise Hills. Kintzinger, 898-2934.
- HOTPOINT electric stove, \$90; Kenmore washer, \$55. Hook, 255-1897.
- GOLF BAG w/14 plastic separator tubes, \$9. Hart, 299-8832.
- '53 PONTIAC Chieftan 4-dr., \$75. Knauss, AX 9-5364.
- '62 STUDEBAKER Cruiser V-8, AT; '61 DKW 2-dr., best offer or trade for older car. Nelson, 264-5169.
- '63 CORVAIR MONZA convertible, 4-speed, must lease new car for business purposes, below book, \$2100. Kuidis, 264-2861.

- ARGUS M-750 Movie Projector, 1 yr. old, cost new \$130; sell for \$60. Roh, 299-3749.
- '62 VW, white, 12,000 miles, radio, leatherette upholstery, shoulder seat belts, '64 tags, blue book. Gregory, 268-2022.
- '51 4-dr. CHEVY, original owner; Smith Corona standard electric typewriter, completely reconditioned. Miner, AX 9-2020.
- ACCORDIAN, 120 bass, \$180; training wheels, \$275. Bradshaw, 268-8708.
- 3-BDR., separate dining room, Bandelier school, \$12,500. Rudeau, 256-2380.
- '48 CHEVROLET club coupe, \$80. Comiskey, AM 8-5120 after 5 p.m.
- '50 FORD V8 TUDOR, R&H, new clutch and transmission, new battery, dual carburetors, finned heads, floor shift, best offer. Carpenter, AX 9-3519 after 5 p.m.
- SELL, TRADE, OR LEASE, 4-bdr. home, near base. Minter, 256-9225 after 5 p.m.
- KITCHEN TABLE, round, drop leaf w/4 chairs. List, 299-9246.
- '56 VOLKSWAGEN, sunroof, radio, seat belts, seat covers, swaybar, bumper stiffeners, needle bearings, 50,000 mi., \$530. Baldwin, 268-9053 after 6 p.m.
- '62 16' Henslee Lodgette travel trailer, \$895. Satterwhite, 268-2687.
- SKIS, 7' Kandahar Combi (A&T), Cubco bindings, \$40. Richter, AX 9-0409.
- DOUBLE BED w/innersprings and mattress, matching nite table, blond oak finish, \$50 or make offer. O'Neill, 255-6355.
- MORSE CODE INSTRUCTOGRAPH, for increasing speed or learning, complete w/ tapes, keys, instructions, etc., \$15. Boling, 282-3256.
- TWO-BDR. HOUSE, garage, carport, covered patio, sprinklers front and back, carpet, drapes, a/c, near bases and university. Schultheis, 2734 Santa Cruz, SE, 247-2812.
- DRAPES, pale green, lined, 85"x140", \$20; '62 Philco 30" pushbutton electric range, \$125. Smith, 256-0375.
- SELL OR TRADE wood garage door, single, furniture, trailer axle, and misc. for what have you. Aaron, 282-3124.
- '52 MERCURY hardtop, right side damaged, as is \$60. Shenk, 255-0357.
- PORCH BLINDS, 5-7', 2-5', and 1-3' spray green aluminum roll-type, \$75; Midget MG, '62, four new tires. McMaster, 268-8062 after 5:15 p.m.
- BOY'S 26" bicycle, \$16; girl's 26" bicycle, \$16; stroller, \$5, headboard for 3/4 bed, \$1. Glenn, 2832 Dakota NE, AM 5-0647.
- '61 MATCHLESS APACHE MOTORCYCLE, 650cc. Grotberg, 299-1704.
- COMPLETE BUNKBEDS, maple finish, \$30; will baby sit day or night. Chavez, 255-1945.
- '57 ENGLISH FORD, \$300. Sharp, 299-3745.
- FOUR VW 7:60x15 tires, some tread, no breaks, \$5; 2 gallons Sandalwood latex paint, \$4; disposal, repairable, \$5. Gillespie, 255-6421.
- STEEL FOLDING CHAIRS, \$1/ea.; pop-up toaster, \$3; real estate contract, 40% discount. Gay, 299-5625.
- STUDIO COUCH, matching chair, beige, \$40. Avara, 265-4171.
- TOBOGGAN, 6' Lund, car bed, converts to car seat. Brooks, 299-1884.
- '49 CHEVROLET 1-ton panel truck, made into camper, will sleep 3 adults, \$300. Cunningham, AX 9-2402.
- TWO VALANCE RODS and two heavy duty traverse rods for large loom; curtain stretchers. Cohrs, 298-6523.

- BRYANT ELECTRIC HOTWATER HEATER, \$20 or trade for what have you. Galbreath, 898-0644.
- 10'x14' COTTON CARPET, rose beige, \$15. Lambert, 344-9012.
- '54 FORD PICKUP and camper, V8, 1/2-ton, 4-speed, heavy wrap around hitch, sell separately or together. Robinson, AL 6-7326.
- '61 WEST WOOD MOBILE HOME, 10x50, 2-bdr., a/c, carpeted, storm windows. Davis, 299-8698 after 5:30 p.m.

#### WANTED

- BABY SITTING, my home. Whitcomb, 256-2274.
- RIDE from Girard, Santa Clara or Princeton SE area to Bldg. 880. Milligan, CH 3-2429.
- OSCILLOSCOPE, 5", DC to 1 meg., Int. sweep. Roberts, AL 5-9527.
- USED TANDEM BICYCLE. Lindsay, AX 9-7454.
- SKI EQUIPMENT for 6 and 8 year old children, boots, skis, poles, etc. Souder, BU 2-3121.
- BOAT TRAILER, 16', 1000# capacity, minimum. Geibel, 299-0275 after 6 p.m.
- JOIN CAR POOL from NE Lomas (Princess Jeanne) to bldg. 829 parking lot or vicinity. Wilson, 298-0049.
- RIDE or join car pool from NE Las Arboles and Gen. Chenault to vicinity bldg. 806. Bortniak, 299-8432.
- DINING ROOM TABLE AND CHAIRS. Stephenson, AX 9-3914.
- WILL RIDE or share ride (2 persons) from San Lorenzo and Rio Grande to any of Tech. Area gates. Gallegos, 344-3290 after 6 p.m.
- RIDE from 600 block of Claudine NE to bldg. 836. Houston, 264-3733.
- BACHELOR to share 3-bdr. house Patsky, 298-6279.
- '59 or '60 pickup and 10' camper. Smith, 268-2141.

#### FOR RENT

- NEW 1-BDR. furnished apt., carpet, drapes, individual patio, forced-air heat, garbage disposal, Palomas and Zuni, \$110. Hughes, 255-4628.
- 2-BDR. HOUSE completely furnished, washer and dryer, electric stove. Martinez, AL 6-7395 after 5:30 p.m.
- 3-BDR, 2 baths, dining room, large utility room, garage, forced air heat, wb fireplace, walled yard, sprinklers, near public-parochial schools, close in NE heights. Meahl, 282-3681.
- QUIET, clean sleeping room, one or two adults, 2837 Washington NE. Morrissey, 255-2993.
- UNFURNISHED APT., new 2-bdr, near base Furs, carpet, drapes, stove, refrig., a/c, 601 Valencia SE. Ross, 255-0486.
- 3-BDR, 2 bath house, carpeting, walled yard, water, NE Heights, \$115. Selph, AX 9-6833 or 877-3651 evenings.
- NEAR BASE, 3-bdr. house, walled backyard, partly furnished if desired, couple or small family preferred, reasonable. McCampbell, 282-3966.

#### LOST AND FOUND

- LOST—VW keys in brown and red case, keys in 3x3 packet, dark rim prescription sun glasses in brown case, pearl handled knife, glasses in brown case, blue plastic rain coat, gray leather gloves, silver Waltham watch. LOST AND FOUND, ext. 264-2757.
- FOUND—Brown memo case pad, men's brown hat and top coat, 10-yr. tie clip service emblem, silver tie clip w/acorn, blk/rk calfskin gloves. LOST AND FOUND, ext. 264-2757.



TWINS Jean and Joan Kirby contributed a confusing element into a recent Caribbean cruise. Jean (2642) is at left. Girls' father, John Kirby, is in 7534.

### Twins Trouble Tour Passengers But Enjoy Caribbean Cruise

Passengers aboard the M.S. Kungsholm on a recent Caribbean cruise were not seasick or seeing double. Jean Kirby (2642) and her twin sister, Joan, wearing identical clothing, were the only confusing factors in otherwise smooth sailing.

"It was a wonderful vacation," Jean says, "and certainly exciting — new places, new people, new experiences, even if my sister and I did confuse the passengers."

The Kungsholm left New York City Oct. 2 and returned Oct. 15. Ports of call in the West Indies included St. Croix, St. Lucia, Barbados, Trinidad, St. John, and St. Thomas.

### Deaths

Sidney A. Merriam, Jr., a Sandia employee for 12 years, died in an auto accident in Arizona on Jan. 4. He was 52.

Mr. Merriam was a Staff Assistant in Scheduling and Ordering Field Support Section I, 2643-1.

Survivors include his widow, Lois (1320), a daughter in Philadelphia, Pa., his father in Provo, Utah, and five grandchildren.



Mrs. Gladys Didero, a Sandia Corporation retiree, died Dec. 30 in Albuquerque. She was hired at Sandia in July 1952 and was an ozalid operator in Division 3462 at the time of her retirement in April 1960.

Survivors include five sisters and a brother. She was a widow.



Sylvan S. Harris, a retired Sandia Laboratory employee, died Sunday, Jan. 12, after a brief illness. Former manager of Records Management and Services Department, Mr. Harris retired in May 1963 with more than 15 years of Sandia service, including two years at Salton Sea Test Base.

Survivors include his widow, a daughter and two grandchildren in California, a sister in New York, and a brother in California.



STATE AND NATIONAL awards have been won by Hazel Vance (7241-2) for her knitting. The crocheted tablecloth was one of her N. M. State Fair entries.

### Knitting Know-How Wins Honors for Hazel Vance In National Competition

Two weeks before the deadline for entries in the New Mexico State Fair, Hazel Vance (7241-2) knit a red lacy-patterned cardigan. The sweater won the first place (knitting and crocheting) sweepstakes award at the fair, and last month placed second in its category at the 1963 National Wool Needlework Contest in New York City.

"I was so surprised," Hazel said. "I'd had the pattern for about 10 years, but had never gotten around to making the sweater. I really had high hopes for a round pineapple-design tablecloth I had crocheted for the contest. It didn't win a thing!"

Hazel is equally proud of having recently passed a course in translating a manuscript into Braille. This is the main requirement for becoming a certified Brailist — of which there are only about 17 in Albuquerque.

### Retiring

Charles E. Ross will retire Jan. 31 after 12 years with Sandia Corporation. He is a driver in Motor Pool Division 4573.

His first plans: "Take it easy." Mr. and Mrs. Ross will continue to live in Albuquerque at 4508 Third NW. They have two married children (including a son in Albuquerque) and eight grandchildren.

Later they plan to visit Mr. Ross' brother in Florida and "kinfolk" in Michigan.



M. D. Meek, a Sandia employee for 10 and a half years, will retire Jan. 31. He is a material handler in Ordering and Shipping Section 2624-1.

Mr. Meek and his wife plan to sell their home at 11600 Constitution NE and live in the country, preferably in the south valley where Mr. Meek could keep a horse. He likes to ride.

Their six children are married; two of their sons live in Albuquerque.

The Meeks plan to visit their son in Los Angeles and Mr. Meek hopes to do a little fishing.



Frank Balok, a Sandia employee for six years, will retire Jan. 31. He has been with Janitor Service Section 4574-2 the entire time.

Mr. and Mrs. Balok will retain their home at 4305 Wallace SE, but will hitch a camper to their car to go fishing, rock-hounding, and visiting relatives scattered across the country.

A native of Gallup, Mr. Balok still enjoys training colts and horses. His hobbies include leather carving, making articles from silver, and designing spurs.



# Are You Listening??

How's your listening I.Q.?

If you think it's high, just listen to Dr. Ralph Nichols, head of the rhetoric department at the University of Minnesota. According to him, studies have shown that college freshmen retain only 50 per cent of a 10-minute lecture and lose half of this material in 48 hours. And listening efficiency is just as low among churchgoers hearing a sermon, jurors receiving instructions from a judge, and business managers hearing a message from their superiors.

Dr. Nichols described the many aspects of the listening problem not long ago. And, based on his own research and that of others, he also showed 10 ways in which people become better listeners:

1. Find the speaker's subject "useful." When the topic of the talk is announced, the poor listener may call the subject dull or "old hat" (and perhaps it is), so he goes off on a mental tangent. The good listener may be just as unimpressed with the topic. But being "trapped" in the audience, he tunes in on the speaker for any new knowledge he can later use. The good listener sifts the wheat from the chaff.
2. Concentrate on the talk, not the delivery. A poor listener may find fault with the speaker's delivery and go off on a tangent because the speaker is "so stupid." The good listener may start at the same point, but he reaches a different conclusion. He realizes the speaker knows a lot more about the subject than he does and makes every effort to pick his brains.
3. Withhold evaluation until comprehension is complete. A poor listener becomes over-stimulated and almost immediately begins forming questions or rebuttals for the speaker. The good listener hears the man out before judging his statements.
4. Try to get the main ideas out of the subject. A poor listener may say, "I listen only for facts." He retains a few facts but garbles many and loses most of them. The good listener concentrates on the concepts the speaker is trying to develop. He understands the central ideas and uses them as links to tie together the whole talk, with facts attached to these links.
5. Adjust note taking to the pattern of the speaker. A poor listener attempts to outline on paper everything he hears. To him an "outline" and "notes" are the same thing. But two months later he is hopelessly confused when he tries to figure out the notebook. The good listener is flexible. How or if he takes notes depends on the

organizational pattern of the speaker. One recommended way for taking notes is listing facts and principles of the talk separately.

6. Be attentive. A poor listener "fakes" attention to the speaker while his mind wanders all over the place. A good listener is not relaxed or passive. He works hard to absorb the subject.

7. Don't be distracted. Obviously, creating or tolerating distractions in the audience severely hinders good listening.

8. Tackle difficult material. A poor listener habitually evades intellectual or thought exercising subjects and, when confronted with a tough topic, isn't conditioned to absorb much of anything. A good listener develops an interest in important, challenging matters and grasps the meaning of what is said.

9. Don't be blocked by emotion-laden words. Some words will create a barrier between speaker and audience. Dr. Nichols, for example, once used the word "evolution" in a talk to college freshmen and later discovered that 40 per cent of the audience had tuned him out. For they associated evolution with atheism. Good listeners, however, do not let one word or several stand between them and the substance of the message.

10. Profit from the differential between speech speed and thought speed. An audience generally thinks at the rate of "400 words a minute," or four times faster than the speaker talks. A poor listener wastes this time differential by drifting back and forth between the speaker and his own thoughts. Dr. Nichols recommends three ways a good listener can gain from this time gap. First, anticipate the speaker's next point. If you guess wrong, you immediately compare your guess with the point he does make and learn by contrast and comparison; if you guess right, that point comes to your mind twice. Second, identify what the speaker uses for supporting evidence. And third, recapitulate periodically the speaker's remarks; this will double your ability to understand and retain the content of the talk.

In stressing the importance of good listening, Dr. Nichols referred to a study made by Loyola University on the question: "What is the most important single attribute of an effective manager?"

The study showed that listening to the individual employee is the most effective way for a manager to know and accurately size up the personalities of the people in his department. The most common report received from thousands of men who testified that they liked their supervisors ran this way:

"I like my boss. He listens to me. I can talk to him."

### Years of Service Mount At Ceremony for Presentation Award

Virgil A. Harris (7223-5) and Kenneth D. Stout (7223-4) met last week in the office of William T. Moffat, Test Range Department 7220 manager, for an informal ceremony honoring their 20-year and 15-year service anniversaries respectively. On hand to offer congratulations with Mr. Moffat were supervisors Gordon L. Miller (7223) and Vernon M. Brewster (7223-4).

The group started talking about the "early days" of Sandia when the Laboratory was operated by the University of California and discovered that between them, they could pool 86 years at Sandia. Each of the supervisors has 17 years with Sandia.

Photographer Leroy W. Paulson (7226-1) stopped by to snap a picture and added another 15 years to the pool for a total of 101 years' Sandia service.

### Sympathy

- To Elmer C. Temple (4514-2) for the death of his sister in Texas on Dec. 24.
- To Joe M. Sanchez (2132-1) for the death of his mother-in-law in Albuquerque on Dec. 30.
- To Edward A. Salazar (1112-1) for the death of his mother in Albuquerque on Dec. 30.
- To James Peden (2452) for the death of his wife on Dec. 3.
- To Willard Koone (7418-1) for the death of his mother in Arkansas on Dec. 25.
- To James D. Appel (7419) for the death of his son on Dec. 25.
- To T. D. Harrison (2561) for the death of his father on Dec. 27.
- To Floyd Irwin (4231) for the death of his mother recently in Indiana.
- To Salomon Hidalgo (4514-4) for the death of his father in Belen on Jan. 9.
- To Andres Sanchez (4575-1) for the death of his sister in Belen on Jan. 12.

## Sandia's Safety Record

**Sandia Laboratory**  
HAS WORKED  
1,260,000 MAN HOURS  
OR 36 DAYS  
WITHOUT A  
DISABLING INJURY

**Livermore Laboratory**  
HAS WORKED  
1,333,000 MAN HOURS  
OR 261 DAYS  
WITHOUT A  
DISABLING INJURY