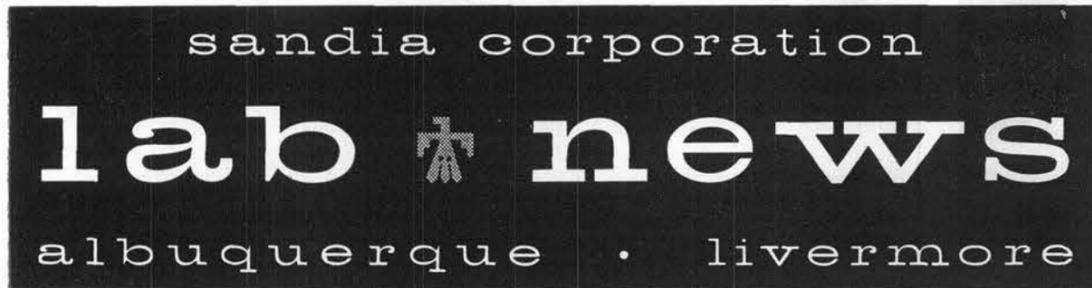


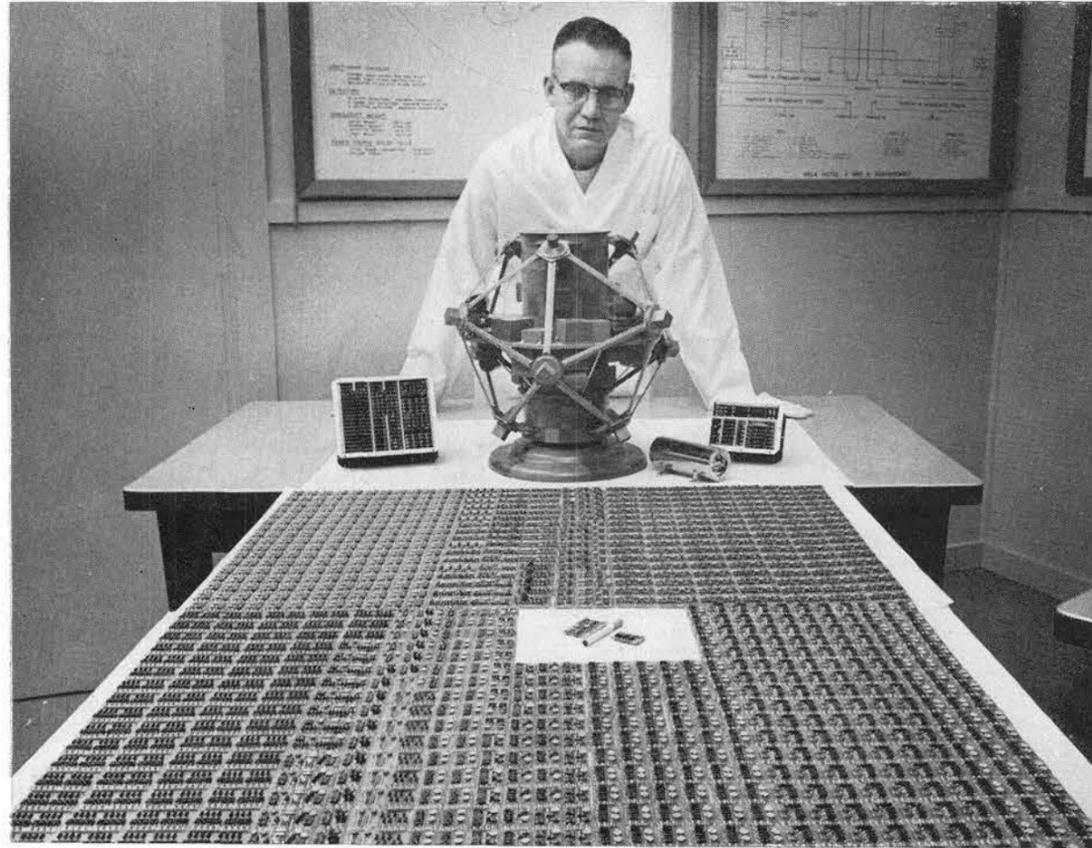
Sandia Payload Aboard New Tandem Satellites



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MULTITUDES of miniature components make up the Sandia Corporation-designed logics systems of the detector satellites. The modules are displayed by Robert D. House (7432-1), a member of the Sandia

team responsible for development of the computer-like logics systems. The systems monitor and transmit only significant data collected by the X-ray, gamma ray, and neutron sensors of the detector satellite.

Detection instrument payloads in the tandem satellites launched recently by the Department of Defense were developed by two Atomic Energy Commission Laboratories, Sandia Laboratory and Los Alamos Scientific Laboratory.

Los Alamos has been responsible for the design and fabrication of X-ray, gamma ray, and neutron radiation detectors for the DOD research program to help develop a satellite-based system for detecting nuclear explosions in space. Sandia Laboratory has been responsible for 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 problem of detecting nuclear tests conducted above 30 kilometers and out to 300 million kilometers from the earth was first studied intensively in 1958 and 1959. Most of the findings were summarized in the Recommendations of the Technical Working Group I which met in Geneva in July of 1959.

At the same time, the two AEC laboratories initiated the development of X-ray, gamma ray, and neutron sensors and associated equipment to be used in a satellite-based detection system. The laboratories also started development of ground-based equipment for detecting high altitude nuclear tests.

Later in 1959, over-all responsibility was assigned to the Advanced Research Projects Agency of the Department of Defense for establishing a research program to improve means of detecting and identifying nuclear detonations conducted underground or in space.

Prototypes Tested

Since that time, Los Alamos and Sandia not only have de-

veloped the payloads for the satellites, but have tested prototype instruments in space. Prototype instruments were first flown up to 70 miles high in Deacon-Arrow rockets launched from the AEC Test Range at Tonopah, Nev.

In 1960, with Air Force permission, instrument loads rode Atlas developmental missiles launched from Cape Canaveral.

Many checkout flights have been conducted since, from Air Force facilities in Florida and California, and during the 1962 nuclear weapons tests in the Pacific. In the Pacific experiments, 17 rocket payloads were launched and all 17 operated successfully.

X-ray Energy

A large part of the energy of a nuclear burst in space is in the form of X-rays. Therefore, primary emphasis is placed on detectors for this type of radiation in order to capitalize on the potential long-range capability of this part of the system. Ten four-in. cubic X-ray detectors protrude at external points of the 400-lb. 20-sided satellite. The flat, triangular faces of the satellite are covered with solar cells to provide electrical power for operating the instrumentation.

Because the relatively "soft" X-rays cannot penetrate through the outer shell of the faces of the satellite, only the detectors on the side toward a nuclear explosion will record the X-ray signal. As the satellite spins about its axis, all directions into space will be scanned by a number of detectors simultaneously. All detectors on the side toward an explosion will record a signal, and these simultaneous signals are the most important means of determining that a nuclear explosion has occurred. Inside the spacecraft are six cylindrical gamma ray detectors and a neutron detector.

The Sandia-built satellite logics system contains more than 23,000 components, including more than 2000 transistors. It performs a function of correlating and comparing detector outputs in a way which permits the satellite to differentiate known natural radiation background from the radiation associated with a nuclear burst. In addition, the system converts pertinent radiation background and state of health data to a form suitable for transmission to the ground which will enable scientists to better distinguish natural phenomena from nuclear bursts.

Detection Distance

It is estimated that the X-ray sensors may be able to detect a 10-kiloton explosion at a distance equal to the diameter of the earth's orbit around the sun.

For less extreme distances, the gamma ray and neutron signals would provide detection capability in case the X-ray system fails. The gamma ray and neutron signals also would be important in confirming that the signal was received from a nuclear explosion rather than from natural radiations in space, such as solar X-rays or cosmic rays.

Sandians at Launch Site

Sandia Laboratory personnel participated in launch activities. At the launch site were W. C. Myre, project leader, D. E. Henry, R. B. Spaulding, R. R. French, and J. R. Phelan, all members of Space Projects Division I, 7432, responsible for the design and development of the satellite logics systems. T. R. Zeller of Ordnance Test Projects Division II, 7215, also participated.

G. A. Fowler, Vice President, Development 7000, D. B. Shuster, Director of Aerospace Programs 7400, and J. H. Scott, manager of Space Projects Department 7430, along with other members of the Sandia stock team—W. E. Goldrick, C. H. Stickley, and F. E. Thompson (all 7432), checked data from the orbiting satellites at the Air Force Satellite Test Center at Sunnyvale, Calif.

They were joined there after launch by Mr. Myre and Mr. French.

\$177,031 Current Total of Sandia Lab ECP Drive

A total of \$177,031 is reported as the latest tally of the Sandia Laboratory Employees' Contribution Plan drive. With 97 per cent of the cards in, the figure shows an increase of \$9000 over last year's total of \$168,000.

Some 377 new members have joined ECP this year. Minimum requirement in ECP is a gift of \$12.

The average gift per contributor, according to the latest count, is \$29.78. There were 5945 contributors.

Average gift of ECP members is \$31.67. Employees who are members of ECP number 5512.

Funds collected by ECP are divided on a percentage basis among the Albuquerque United Fund and seven other health and welfare agencies.

AEC Is Seeking Bids From Small Businesses For Sandia Test Facility

Bids will be invited Nov. 15 for construction of a one-story concrete frame addition to Bldg. 872, the Atomic Energy Commission announces. The bids, invited on a set-aside basis for small business firms only, will be opened about Dec. 10.

The new addition will be an electromagnetic radiation facility for use by System Division 7331.

Work, to be completed within 140 days after the contractor is told to proceed by the AEC, will consist of a building addition with masonry panel walls and partitions, and a pre-stressed concrete T-roof.

The project includes a high bay area of approximately 1,875 sq. ft., with a six-ton overhead bridge crane, and a low bay area of some 1,078 sq. ft. with a laboratory, dark room, storage, and equipment rooms.

A. W. Dennis (4543-3) is the Plant Engineering Department project engineer.

D. W. Ballard Elected National President Of Society for Nondestructive Testing

Douglas W. Ballard took office this week as national president for the Society for Nondestructive Testing. The ceremony took place during the annual convention of SNT in Cleveland, O.

Doug, supervisor of Advanced Manufacturing Development Division 2564, is the immediate past vice president of SNT and served as general chairman of the convention. He has held various offices in the Society for Nondestructive Testing. He was instrumental in establishing an Albuquerque section of SNT in 1960 and served as its first chairman. He served as national education chairman of SNT from 1958-1961, a period which saw the establishment of a vigorous national and local educational program to provide newcomers to the field with basic information on nondestructive testing advantages and limitations.

He served as national director of the Society from 1959-61, national treasurer in 1961-62, and national vice president since 1962.

Served At Oak Ridge

A native of Selma, Ala., Doug received an early introduction to the nuclear weapons fields. While attending Auburn University in 1943, he was called into the Army Corps of Engineers, sent to City College of New York for continued study in mechanical engineering, then transferred to Oak Ridge to work on the Manhattan District A-bomb project.

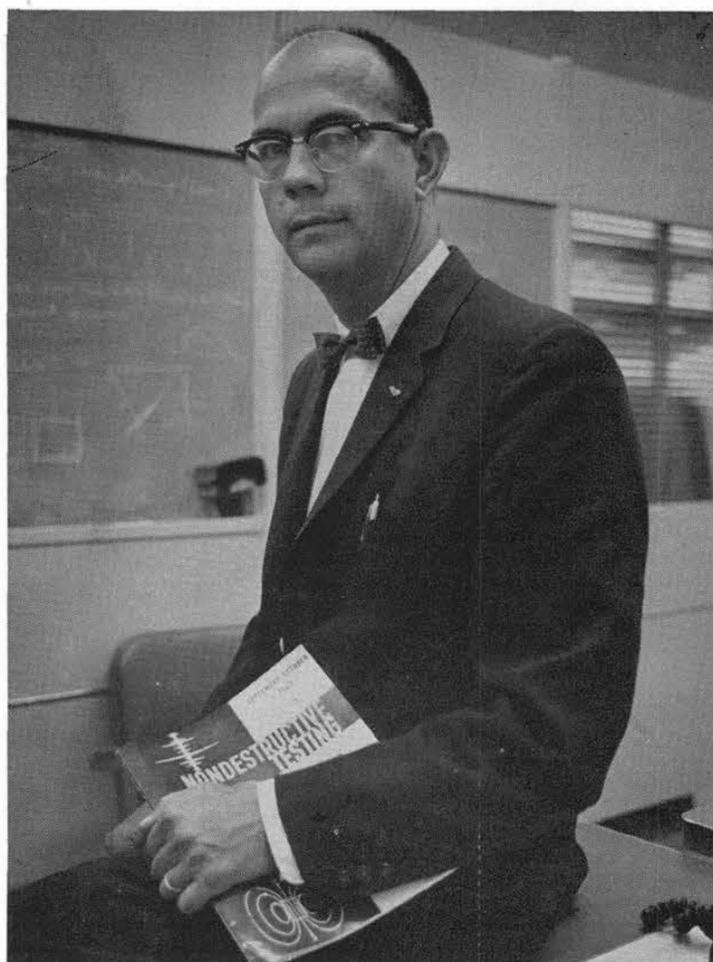
At Oak Ridge he was assigned to use some of the first mass spectrograph leak detection equipment. This equipment played a vital role in detection and repair of flaws in vacuum lines and coolant tubes used in the electromagnetic separation of U-235 and U-238 from natural uranium ore for use in the first A-bombs.

Doug was transferred to Los Alamos Scientific Laboratory in

1945 where he was assigned to work in plutonium metallurgy. He was discharged from the army in 1946, but remained at LASL until 1948. During much of this time he was in charge of a group responsible for casting, pressing, extrud-

ing, machining, plating and inspecting plutonium components for use in weapons.

His first association with SNT was through membership in the Los Alamos section. His work (Continued on Page Six)



Douglas W. Ballard (2564)

—National President of the Society for Nondestructive Testing—

Promotions

Doris W. Price (3126) to Typist Clerk
 Sharon Sue Burnett (2642) to Teletypewriter Operator
 Joe P. B. Armijo (3427) to Messenger
 David J. Sanchez (3427) to Messenger
 Emma Lu Bunch (3126) to Secretarial Stenographer
 Marie Consuelo Gomez (3126) to Secretarial Stenographer
 Dorothy J. Hickman (3126) to Secretarial Stenographer
 Charlotte M. Wickham (3126) to Secretarial Typist
 Vadare M. Cornelison (4135) to Invoice Clerk
 Hellen M. Grotberg (7512) to Data Reduction Clerk
 Maureen G. Connell (1443) to Data Reduction Clerk
 Vivian R. Hedman (4152) to Accounting Clerk
 Dorit N. Mathers (8212) to Typist
 Donna M. Martinez (8161) to Record Clerk
 Florence B. Taber (7535) to Secretarial Typist
 Elizabeth T. Gary (3310) to Secretary
 Jane S. Holman (1000) to Secretary
 David B. Davis (7325) to Laboratory Assistant
 Delbert E. Houser (8223) to Machinist
 Bruce L. Barth (7423) to Staff Associate, Technical
 Howard W. Pumphrey (7423) to Staff Associate, Technical
 William D. Harwood (7523) to Staff Associate, Technical

John C. Robinson, Jr. (7532) to Staff Associate, Technical
 Clyde H. Deeds (4114) to Staff Assistant, Administrative
 George Baca (4574) to Janitor
 R. W. Fitzgerald (4574) to Janitor
 John E. Hager (4233) to Layout Technician
 Earl C. Deno (8222) to Maintenance Man
 Elmie R. Newton (8222) to Carpenter
 Ann M. Elniff (3126) to Steno Clerk
 George W. Cosden (4372) to Staff Member, Administrative
 Jose S. Dominguez (4575) to Laborer
 Reynaldo Gonzales (4575) to Laborer
 Marion P. Apodaca (4233) to Plate Maker
 Robert D. Eiler (4632) to Repairman
 H. Dewayne Heffington (8222) to Utility Man
 William H. Brown (3427) to File Clerk
 Lois M. Nelson (3427) to Document Clerk
 Jacquelynn Lagermann (4431) to Document Clerk
 Benito C. Chavez (3452) to Data Processing Clerk
 Betty J. Watson (3423) to Typist
 Dorothy H. Raper (4432) to Editing Clerk
 W. M. Whittington (4441) to Data Reduction Clerk
 Lois R. Class (7333) to Data Reduction Clerk
 Lois H. Anderson (2563) to Data Reduction Clerk
 Mary Beth Eastman (6021) to Financial Clerk
 Ernest J. Church (7242) to Computer Facility Operator
 William L. O'Trimble (4333) to Accounting Clerk
 Lewis G. Sisneros (4135) to Investigator
 Jeffri M. Ambrose (8225) to Assembler
 Patricia I. Warmboe (8225) to Coil Maker
 Beverly R. Elrod (8123) to Secretarial Typist
 Sharon M. Huddleston (8214) to Record Clerk
 Joseph C. Tremi (8225) to Shop Clerk
 Joseph E. Buchler (8213) to Supply Clerk
 Richard H. Shaw (4413) to Draftsman
 Laurie D. Krebs (3430) to Secretary
 L. C. Trujillo (2564) to Laboratory Assistant
 Donald A. Bower (4233) to Staff Assistant, Technical

Supervisory Lateral Transfers

J. M. Miller from 4613-2 to 4611-2
 C. M. Dixon from 4611-2 to 4614-3
 O. D. Chapman from 4614-3 to 4613-3
 W. L. Paxton from 4613-3 to 4613-2
 J. C. Hart from 4510 to 4620
 R. Findlay from 4620 to 4570
 R. D. Flaxbart from 4570 to 4510
 J. R. Bell from 4252-2 and 4252-3 to 4252-1
 W. H. Seelbach from 4252-1 to 4254-3
 J. A. Hay from 4254-3 to 4252-3
 R. D. Becker from 4253-2 to 4253-3
 R. J. Gorney from 4253-3 to 4254-6 and 4254-7
 E. J. Peterson from 4254-6 and 4254-7 to 4253-2
 G. W. Krause from 1321-3 to 2541-1
 C. M. Gabriel from 2542 to 2544
 A. L. Thornton from 1553 to 2542
 E. G. Connelly from 2641-1 to 2643-4
 R. H. Johnson from 4211-2 to 4253-1
 G. R. Zahm from 4253-1 to 4254-5
 W. R. Parker from 4254-5 to 4252-5 and 4252-7
 C. C. Paschal from 4252-5 and 4252-7 to 4254-4
 F. H. Long from 4254-4 to 4252-2
 A. B. Draper from 2413-3 to 2413-1
 R. F. Stefoin from 2412-1 to 2413-3
 W. T. Schmedding from 8223-1 to 8223-2
 G. W. Randle from 1511-2 to 1512-1
 H. V. Peterson from 8233-4 to 8231-4
 D. W. Bauder from 7323-1 to 7311-2
 B. Johnson from 7331-1 to 7323-2
 E. White from 7311-2 to 7331-1
 T. E. Smart from 7333-1 to 7331-4
 L. A. Hopkins from 2500 to 1300
 L. D. Smith from 1300 to 1500
 H. E. Lenander from 1500 to 2500
 G. L. Miller from 7244 to 7223
 H. D. Austin from 7222 to 7244
 T. E. Zudick from 3465-1 to 3465-2
 W. S. Hunter II from 3465-2 to 3465-1
 F. H. Schneider from 4361-4 to 4315-2
 R. D. Freyermuth from 4315-2 to 4314-1
 H. L. Crumley from 4314-1 to 4342-1

Sandia Speakers

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

A. C. Littleford (2442), "Improving Test Equipment Reliability by Systematic Design Review Techniques," Eighth Annual Interworks Test Engineering Conference, Oct. 30-Nov. 1, Princeton N. J.

K. H. Miller and J. R. Kannolt (both 2422), "A Digital, Inter-mittent Data Flow, Magnetic Tape Recording System," National Electronics Conference, Oct. 28-30, Chicago. Mr. Kannolt will make the presentation.

E. H. Beckner (5153), "Collision of Polarized Plasmas," annual meeting of the Division of Plasma Physics, Nov. 6-9, San Diego, Calif.

J. R. Banister (5153), "New Impulse Tube Results," Annual meeting of the Division of Plasma Physics, Nov. 6-9, San Diego, Calif.

George W. Elliott (3151-2), "Utilization of Mechanical Engineers in Industry," annual meeting of Pi Tau Sigma, mechanical engineering honorary society, Oct. 16, Ames, Ia.

A. D. Swain (1443-2), "A Method for Performing a Human Factor Reliability Analysis," Human Factors Sub-committee, Electronics Industry Association, Oct. 21-22, Palo Alto, Calif. Mr. Swain discussed this same paper before the Human Factors Society during its annual convention Oct. 23-24 in Palo Alto.

K. J. Craswell (5425), "Estimation of a Selected Function," annual meeting of the Institute of Mathematical Statistics, Aug. 28, Ottawa, Ontario, Canada.

C. F. Bild (1100), "Failure From a Materials Point of View," Albuquerque Section of the American Society for Quality Control, Sept. 16, and "Contamination Control—Cleaning and Verification," Western Regional Chapter of the American Association for Contamination Control, Sept. 18, Los Angeles, Calif.

J. M. Wiesen (1440), "Accuracy of Measurements," 18th Annual Midwest Quality Control Conference, Oct. 10-12, Tulsa, Okla., and "Acceptance Sampling at Sandia," a statistical meeting, Sept. 24-25, Rocky Flats, Colo.

J. L. Tischhauser (7242), "Sandia Corporation Installation Report," 12th CO-OP Conference, Sept. 5, New York City.

W. J. Whitfield (2564), "State-of-the-Art (Contamination Control) and Laminar Air Flow Concept," North Central Chapter of the American Association for Contamination Control Society, Sept. 25, Chicago, Ill.

G. R. Case (1533), "Nuclear Weapon Effects," Civitan Club, Sept. 26, Albuquerque.

R. R. Prairie (1443), "2nd Factorial Experiments With the Factors Applied Sequentially," Ninth Conference on the Design of Experiments in Army Research Development and Testing, Oct. 23-25, Redstone Arsenal, Huntsville, Ala.

B. Morosin and A. Narath (both 5151), "X-Ray Diffraction and Nuclear Quadrupole Resonance Studies of Chromium Trichloride," 21st Pittsburgh Diffraction Conference, Nov. 6-8. Mr. Morosin will make the presentation.

Ann Paxton (3152)

Take a Memo, Please

Take time to take care! Some accidents are caused by a careless attitude.

Sympathy

To Maxine Gatlin (3121-2) for the death of her husband Oct. 16 in Albuquerque.

To June Williams (5310) for the death of her father in Tulsa, Okla., last week.



AERIAL PHOTOGRAPH taken by Dick Illing gives some idea of the rugged area south of Chihuahua.

Mexico's Grand Canyon Well Explored by Sandia Adventurer

Barranca de Cobre, Mexico's "Grand Canyon," recently in headlines when a group of American explorers was believed missing there, has been visited three times in the past two years by Dick Illing (7419).

"The area is not really unex-

plored," he said, "but it is untamed and very wild. It has been publicized in recent years and is becoming more popular."

Dick has explored with friends the Urique Canyon and Barranca de Cobre (the Rio Urique flows through both), as well as many

side canyons. The starting point is usually the village of Urique, which is reached only by foot, mule, or airplane. He has high regard for the ability of Mexican pilots in landing planes on the tiny, often steep, air strips found in that area.

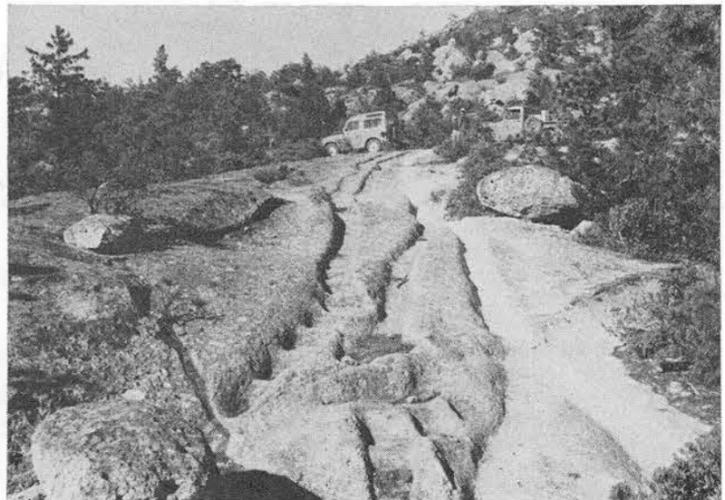
"The Tarahumara Indians make wonderful guides," Dick said. "Even during the night you can occasionally see a flicker of their pine torches as they follow a path through the woods."

The mountain tops are clad in pine forests which receive a coating of snow in winter, but descending into the canyon the growth becomes semi-tropical until at the river level (7000 ft. below the rim at the deepest point) a machete must be used to hack through the very thick growth. "We even found wild orange trees near the bottom," Dick recalled.

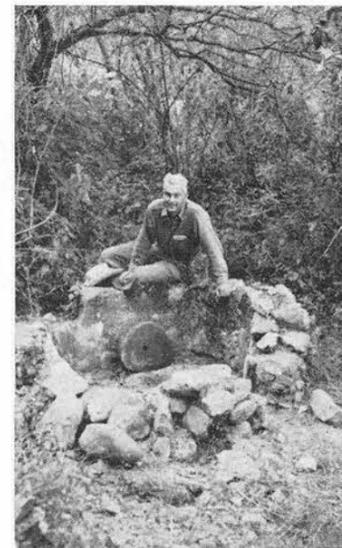
Wild animals are virtually extinct and only a few fish are found in the rivers, but the birds and flowers are beautiful and plentiful, as well as many varieties of herbs which the Indians eat.



STONE LEAN-TOS are constructed by Tarahumara Indians in Barranca de Cobre and many side canyons. Their main food is corn and chili.



FOOTPATH used by Tarahumara Indians for centuries has gradually worn into the native rock. This is near the end of the Jeep road.



ORE GRINDER being examined by Dick Illing was probably used by early Spaniards in their mining.

Congratulations

Mr. and Mrs. W. Rappleyea, Jr., (4254-2), a son, Randolph Aaron, Oct. 13.

Mr. and Mrs. M. J. Snyder (4135), a daughter, Teri Marie, Oct. 2.

Mr. and Mrs. Orlando Torres (3427-1), a son, John Anthony, Oct. 9.

Mr. and Mrs. Kenneth Paul (4432-1), a son, Timothy Shain, Oct. 4.

Mr. and Mrs. Frank Crutcher (1511), a son, Mark Allen, Oct. 11.

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New Safety Activities Outlined At Special Safety Meeting

"We have had 10 serious accidents in recent months," Dave Tarbox, Director of Security and Industrial Relations 3200, told some 200 Sandia Laboratory supervisors in a special safety meeting recently.

Mr. Tarbox emphasized that safety of employees is a primary concern of the company, regardless of cost. S. P. Schwartz, Sandia Corporation President, told the supervisors, "As managers, it is our responsibility to provide working conditions that are safe and it is our responsibility to see that employees work in a safe way."

"In addition to the suffering of the injured employees and

their families, accidents occurring this year have cost the company more than 297 work-days of actual lost time," Mr. Tarbox said. "The Medical Organization estimates that these 297 days plus the 555 work-days also lost this year as a result of prior accidents will cost the company about \$80,000 this year. This figure includes the cost of lost time, permanent disability payments, and medical expenses."

After reviewing details of recent accidents, Mr. Tarbox outlined four new safety activities which will go into effect in organizations performing operations with explosives or other hazardous operations.

1. Inspection: Work areas, equipment and tools, and protective equipment will be inspected regularly from a safety viewpoint and results reported on a new inspection form.

2. Safe operating procedures will be reviewed and verified to make sure that employees understand them and use them in all operations.

3. A safety monitoring system will be established with daily checks and weekly checks in varying degrees of intensity.

4. Safety training and safety meetings will be given new emphasis.

In addition, Safety Engineering Department 3210 will be working with line organizations to develop more intense safety education and training programs.

"We'll give you working conditions and good safety practices," Mr. Schwartz said in concluding the meeting. "But you have to agree that they are good. Once you are satisfied that safe conditions and safe practices are established, you will have to insist that they be used."

Annual ASME Symposium Has Sandians on Program

Preparations are about complete for the Fourth Annual Symposium of the New Mexico Section of the American Society of Mechanical Engineers scheduled Nov. 1-2. Called "Technological Explosion," the symposium will feature a number of Sandians on the program, according to G. C. McDonald (1550), general chairman.

Keynote address will be delivered by E. H. Draper, Vice President, Development and ASME Region VIII Vice President. Mr. Draper will also chair the first morning session.

Afternoon session Nov. 1 will be chaired by R. A. Bice, Vice President, Engineering for Manufacture. R. B. Powell, Vice President, Personnel, will moderate a panel discussion on "Education Obsolescence and How to Combat It" during the second day's program. D. J. Jenkins, manager of Personnel Research, Training and Education Department 3130, will be a member of the panel.

Darrel E. Munson (1113) will

present a technical paper, "The Influence of Deformation Mechanism on the Response of Metals in Extreme Environments."

Other highlights of the program include "The Hydrocarbon Fuel Cell" by H. A. Liebhafsky of GE Research Laboratory; "Automation and the Air Traffic Problem" by W. N. Pike, Federal Aviation Authority; "MRMU—A System of Mobile Remote Manipulator Units for the Recovery of Radioactive Packages" by Capt. D. G. Jones, Kirtland Weapons Laboratory; "New Avenues in Astronomy" by J. A. Hynek, Northwestern University; and "High Temperature Plastics—New Families of Polymers" by H. W. Levine, Narmco Research.

Programs are being printed now and should be available Monday, according to John Engelland (1544), publicity chairman. They will be posted on Sandia Laboratory bulletin boards or copies will be available from John.

Charles A. Gump Died Oct. 12 At Livermore



Charles A. Gump, a staff assistant in Product Control Division 8161, died on Oct. 12. He was 48.

Mr. Gump is survived by his wife, Mary Catherine, and his father, Alfred.



MEMBERS of Sandia's Book Publishing Review Committee include (l to r) R. M. Betz, Patent Manager 6010; A. Y. Pope, manager of Aero- and Thermodynamics Department 7420; W. F. Carstens, supervisor of Technical Informatics Division 3423 and committee secretary; M. K. Linn, manager of Technical Information Department 3420; R. S. Claassen, Director of Physical Research 5100 and committee chairman, and J. W. Weihe, manager of Mathematical Research Department 5420. Not pictured: T. S. Church, manager Electronic Devices Department 1410.

Publishing Review Group Guides Sandia Authors

"It is with books as with men: a very small number play a great part." The number of books being published today far exceeds that of Voltaire's time, but his basic observation remains valid; books continue to play a vital part in the advancement of our technology and our culture.

The publication of worth-while books by Sandia Corporation authors is encouraged by management because such publication contributes alike to the professional standing of the authors, to the reputation of the Laboratories, and to the spread of knowledge.

General guidance over book writing activities is exercised by a Book Publishing Review Committee. Committee members are R. S. Claassen (5100) chairman; T. S. Church (1410); M. K. Linn (3420); J. W. Weihe (5420); R. M. Betz (6010); and A. Y. Pope (7420). Secretary for the committee is W. F. Carstens (3423). Technical Information Department 3420 coordinates book publishing activities.

"The principal function of the committee is to apply Corporation publishing policy to individual proposals for books being written by Sandia employees," Mr. Claassen explains.

Any employee planning to write a technical book should prepare a prospectus and outline, and submit them through his line to his director. The director will, after approval, send the prospectus and outline to the Director of Technical Information and Publications 3400, who, following review, will forward it to the book publishing review committee through the committee secretary.

After reviewing the book proposal, the committee determines whether the content is related closely enough to the work of the Corporation for the committee to assume jurisdiction.

Jack R. Wittek, 8121-1, Died Suddenly Oct. 10

Jack R. Wittek, a staff assistant in Environmental Test Division 8121-1, died suddenly Oct. 10 while on assignment at the Tonopah Test Range. He was 34.

Survivors include his wife, Valeria Jean, and two children, Richard William and Lori Jean.

If the committee finds that it should assume jurisdiction, then it will determine whether publication is worth-while, whether AEC funding should be sought, whether the proposed authorship is appropriate, and what the proper timing for publication should be.

If the proposal is approved, the committee will advise the author through his own Director as to how he should proceed. If the committee assumes jurisdiction, contract arrangements, copyright and royalties are determined by the degree of interest of the AEC, Sandia and the author.

If the committee does not assume jurisdiction, the author may proceed without further Sandia action, provided that no Corporation information, time, or assistance is used in the preparation of the book.

Books which have been, or are being written by Sandia authors cover a number of technical subjects. C. W. Harrison, Jr. (1425) and R. P. King of Harvard University have nearly completed a textbook, sponsored by the AEC, on electromagnetic radiation and antennas.

A book by Kathryn Lawson (5152), entitled *Infrared Absorption of Inorganic Substances* was published by Reinhold Publishing Co. in 1961.

A *Handbook of Statistical Tables*, which is now in print, was written by D. B. Owen (5425). It was featured as a technical book of the month by the New York Public Library.

P. H. Adams (7323) and R. C. Dove have completed a book concerning studies of experimental stress and motion measurement, to be published next February.

New editions of three books are being prepared by their author, A. Y. Pope (7420). Topics of the books include high-speed wind tunnel testing, low-speed wind tunnel testing, and aerodynamics of supersonic flight. K. L. Goin (7422-3) is co-author of the book on high-speed testing.

"It should be emphasized that the committee is encouraging Sandia people who are capable of writing a useful book to do so," Mr. Claassen continued. "There's a continuing need for technical books which reflect well on the stature of Sandia and the staff."



PROGRAM of the Fourth Annual Symposium of the New Mexico Section of the American Society of Mechanical Engineers is discussed by (from left) E. H. Draper (1000), ASME Region VIII Vice President, E. H.

Copeland (7311), ASME New Mexico Section chairman; and G. C. McDonald (1550), general chairman of the Symposium. Sessions will be held Nov. 1-2 in the New Mexico Union on the University campus.

Museums, Galleries Attract Sandians

Calla Ann Crepin Earns MS Degree At Western Reserve

Calla Ann Crepin recently received her MS degree in library science from Western Reserve College in Cleveland. She is now assigned to Library Section 3421-1.



She previously earned a BA degree in biology from Lake Forest College, Ill. A Sandia employee since 1956, Miss Crepin was an employee interviewer in the Employment Department at the time her leave-of-absence was granted.

Last week she officially represented Sandia Corporation on the Weapon Data Indexing committee, which was holding its twice-yearly meeting at Oak Ridge. The committee is comprised of various users of weapon related information (such as Defense Atomic Support Agency, Los Alamos Scientific Laboratory, University of California).

J. H. Sackey to Retire From Sandia At End of October

Retiring the end of October will be John H. Sackey, who has worked in Sandia's Electrical, Refrigeration and Air Conditioning Division 4511 for the past five years.



Mr. Sackey previously had his own refrigeration service company in Galesburg, Ill., for 24 years.

Mr. and Mrs. Sackey are looking forward to living at Sun City, Ariz., where they have already purchased a home. "We've been watching this city grow for the past three years and are very enthused about it," he said. The community is designed for persons 50 years or older and offers many activities.

The Sackeys have married sons in Gallup, N. M., and Safford, Ariz., and six grandchildren.

Both enjoy square dancing, and Mr. Sackey is an amateur photographer. He also likes to bake bread and fancy pastry. "I'm never going to memorize a recipe again," he says. "Last time I forgot the eggs!"

No matter what your interest—modern art or primitive New Mexican grape presses, there is likelihood good examples will be found in one of Albuquerque's specialized museums or galleries.

Sandia employees and their families in Albuquerque are finding a wealth of Southwestern Americana almost right at their own front door.

The University of New Mexico seemingly has a corner on the largest number and greatest variety of exhibits. Most outstanding is the recently-opened Fine Arts Center Gallery which is presenting through Thanksgiving a show entitled "Taos and Santa Fe: The Artist's Environment, 1882-1942." The exhibit area is well-lighted and moveable panels can be arranged to accommodate different types of showings, such as forthcoming December exhibition of 120 large lithographs. Gallery hours are noon to 5 p.m., Tuesday through Friday, and 1:30 to 5:30 p.m. Sundays.

UNM Anthropology

Another comparatively new exhibit area on campus is the anthropology museum (in the old Student Union Building), which includes Indian rugs, pottery, and baskets from the Maxwell collection, some 300 pieces of rare Indian pawn jewelry on loan from the Udall collection, as well as items from the university's own collection. Visiting hours are 9 a.m. to 4 p.m. Tuesday through Saturday.

Also on campus are the Geology Museum, a permanent display in Marron Hall of books published by the New Mexico Press, rare books

in Zimmerman Library, and changing art exhibits in the Raymond Jonson Gallery and the New Mexico Union. Call the university for information about hours these buildings are open; all are closed on academic holidays.

That early New Mexico grape press, and examples of Spanish, Indian, and native art can be found in the Fred Harvey Museum (next to the Santa Fe depot). One showcase is devoted to Kachina dolls, another to "santos." Large burden baskets hang from the ceiling and the center of the room is occupied by a rustic Spanish bull cart dating back to 1880. This museum is open from 8 a.m. to 5 p.m. every day of the year—except when the trains are in.

Historical Society

Another popular spot is the Albuquerque Historical Society's museum in Old Town (at 316 Romero NW). Included in the current show are rooms depicting life in Spanish Colonial days, one furnished in the style of American Pioneers after 1846, and a third in Early Pueblo style. The exhibits change every several months and individual items are mainly on loan from private collections. Visiting hours are 1 to 5 p.m. Wednesdays through Sundays.

Examples of art and crafts are also on display at Botts Memorial Hall (adjoining the Albuquerque Public Library), Los Griegos Branch Library, Prospect Park Branch Library, Sandia Base Special Services Library, Civic Auditorium, and to a limited extent in other public buildings throughout Albuquerque.



EARLY SPANISH, Indian, and native art can all be found at the Fred Harvey Museum at the Santa Fe depot in downtown Albuquerque. Joe Calek (7523-3) is examining an 80-year-old Spanish bull cart.



TECHNICAL ILLUSTRATOR Bill Wagoner (3463-3) enjoyed his visit to the University's Fine Arts Center gallery. The present show, featuring many nationally-known artists, will continue through Thanksgiving.



TWO GREY HILLS rug and large Apache basket received special attention from Sandra Borgrink (3151-1) at the University of New Mexico Anthropology Museum. A member of a pioneer Farmington family, Sandy also liked the Udall loan collection of Indian pawn jewelry.

Mississippi Seismic Research Tests Delayed Until Spring

A planned series of Atomic Energy Commission-Department of Defense seismic research nuclear detonations in Mississippi has been delayed until at least next spring, because of construction difficulties.

Sandia Corporation's participation in the project includes close-in ground motion measurements of the detonations and providing support in arming the devices.

Three experiments in the Tatum Salt Dome near Baxterville are planned as part of the DOD program of research on nuclear test detection (Project Vela), over-all responsibility for which has been assigned to the DOD's Advanced Research Projects Agency.

The Atomic Energy Commission's responsibilities in support of the three underground experiments include preparing the site, detonating the devices, maintaining public safety, and accomplishing certain close-in instrumentation to determine the actual force of the explosions.

The three experiments are designed to develop improved means for detecting and identifying under-

ground nuclear explosions. None of the planned experimental detonations has been fully authorized. The first would be a five-kiloton "tamped" explosion about 2,700 feet underground. It would be followed some time later by two 100-ton explosions, one "tamped" and the other "decoupled" at about 2,000 feet underground. The "decoupled" explosion would be in the center of an excavated cavity measuring about 95 feet in diameter. The "tamped" explosion would be at the bottom of drilled holes.

Repeated efforts by AEC contractors to seal off underground water entering the emplacement hole for the first test have been unsuccessful. As a result, the hole will be used for instrumentation, and contractors will be invited to bid on drilling a new emplacement hole.

AEC contractors also have experienced construction difficulties in drilling and casing an access hole for the proposed 100-ton decoupled explosion, requiring a new hole to be drilled and cased. The difficulties involve imperfect alignment of the partially drilled hole and failure of joints in the casing.



PIONEER KITCHEN of 1846 was of particular interest to Emma Vasquez (4314-1) at the Albuquerque His-

torical Society's museum in Old Town. Emma likes antiques and owns a 300-year-old spinning wheel.

Sandia to Recruit 210 New Graduates This Fiscal Year

Sandia Corporation will hire 210 new graduates from leading universities, colleges, and technical institutes from across the nation in Fiscal Year '64, a group of Sandia recruiters was told at a briefing session last week. These new hires will meet the requirements for both Sandia and Livermore Laboratories.

Of the total to be hired, 25 will hold PhD degrees, 30 will have Master's degrees, and 40 will enter the Technical Development Program for further study beyond a Bachelor's degree. In addition to these candidates with technical degrees, 15 administrative people will be hired with Bachelor's or advanced degrees.

The largest single group to be recruited will be Technical Institute graduates. One hundred TI graduates will be hired in FY '64.

Sandia recruiters are frequently alumni of the schools to be visited. About 48 recruiters will visit 90 campuses to encourage carefully selected graduates at the MS, BS, and TI graduate levels to apply for employment with Sandia Corporation. In addition, about 45 PhD recruiters will visit some of these and other campuses to interest selected PhD candidates in Sandia employment. Recruiting trips will be made this fall and next spring.

Hiring Program Changes

In the early days at Sandia Corporation, an employment philosophy was developed to meet the needs of a young, rapidly growing organization. When Sandia was incorporated in 1949, a major part of its mission was to produce nuclear weapons. As a result there was an immediate need for people with a depth of specialized experience in the production of complex devices. As openings occurred, people were sought who had the specific training and experience to match the need.

However, the nature of Sandia's job has changed, has become even more sophisticated and complex. Sandia has evolved into two advanced laboratories concentrating on basic and applied research and on engineering design and development. Sandia still retains important manufacturing liaison responsibilities, but here again, research and development in advanced manufacturing techniques is a primary concern.

Sandia's staff is no longer growing numerically. In 1957, 1742 people were hired. In 1962, only 724 were hired, a decrease of

1018. Hiring has steadily declined for two reasons: first, the staff has reached the numerical level required to accomplish its mission; second, as the Corporation matures and stabilizes, there are fewer terminations and fewer replacements are required.

Replacement Job Difficult

However, the job of acquiring the right replacements to meet the needs created by Sandia's changing mission has become even more difficult. The aim of the present hiring philosophy is to strengthen and enrich the present staff by adding to it men who can bring up-to-the-minute scientific and technical academic knowledge into the Corporation. Greater emphasis is being placed on long range requirements of the laboratories.

Recruiters now concentrate on acquiring recent graduates, current in new technologies, from leading academic institutions accredited by the Engineers' Council for Professional Development. In attracting new graduates, Sandia must compete with many other industrial and governmental laboratories which also seek the very best qualified men available.

The change in recruiting philosophy has brought about significant changes in the ratio among the various kinds of employees hired. The percentage of new employees who are hired direct from college has doubled since 1957. The percentage of technical institute recruits has quadrupled, while the percentage of experienced staff people hired has been cut in half.

With Bell System

Both Sandia Corporation's employment personnel and the entire college recruiting cadre have been carefully trained in new recruiting techniques. As a member of the Bell System team, which includes Western Electric and the Bell Telephone Laboratories, Sandia shares the benefit of the team approach. Sandia also participates with the Bell Telephone Laboratories and with Bellcomm in a PhD resume exchange program, which increases Sandia's ability to acquire outstanding PhD candidates.

Staff Aides

In recent years, Sandia has been recruiting an increasing number of technical institute graduates. These TI graduates complement our staff of graduate engineers and scientists, leaving them more free to work in the

higher level engineering and scientific research areas.

Recruiting Primary Concern

As the Corporation mission has changed, employment organizations at both laboratories have changed procedures and approaches to perform their new responsibilities—"recruitment" rather than "employment" is the operating plan. Recruiters are carefully selected and given intensive training in interview techniques and methods of judging candidates.

Employment representatives organize and coordinate the recruiting efforts and make follow-up contacts with the candidates from the first interview until they visit the laboratories. Then the original recruiter again plays an important role in acquainting the recruit with Sandia and Albuquerque. The interviewing supervisors from the interested line organization introduce the candidate to the work of Sandia.

The system has proved successful. Personnel reports that Sandia gets one acceptance for every two candidates invited to join the company—a ratio that is very high in the current competitive market for the highly qualified scientist and engineer.

Sandia Hosts Session On 'True Position Dimensioning System'

Sandia Laboratory was host last week for a three-day briefing session on "Concepts of the True Position Dimensioning System." Twelve representatives of six Atomic Energy Commission contractors attended the briefing.

The contractor representatives are responsible in their organizations for training personnel to use the new Sandia Corporation standard on dimensions and tolerances.

Conducted by R. F. Utter of Technical and Trades Division 3132, the session explained use of a programmed training package on the subject. Other Sandians conducting portions of the briefing were A. D. Bridegam (4412), Roy Dell (4421), D. R. Fisher (3132), and J. E. Taylor (2564), who were members of the team that originally developed the content of the programmed textbook.

Service Awards

15 Year Pins



Edward S. Ames
7251
Oct. 29, 1948



Harold Christenson
2625
Nov. 1, 1948



John C. Eckhart
7250
Nov. 1, 1948



Edward F. Ehrman
1432
Nov. 1, 1948



Earle C. Pace
4370
Nov. 1, 1948



Jose A. Silva
1433
Nov. 1, 1948



M. W. Hancock
3465
Nov. 2, 1948



Jerry Olguin, Jr.
2641
Nov. 2, 1948



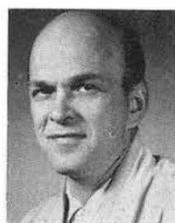
Rosalie F. Crawford
1
Nov. 3, 1948



William H. Shively
4513
Nov. 4, 1948



Kenneth E. Bricker
2343
Nov. 8, 1948



Armand F. Fink
7214
Nov. 8, 1948

10 Year Pins

Nov. 1-30

Richard V. Pass 7333, Betty L. Baros 3421, Kathryn F. Vickery 3126, Norma N. Goodwin 4431, Allan M. Fine 9130, and William M. Sodka 2332.

Army Awards Largest Missile Contract to Western Electric

On Oct. 1 the Army awarded the largest single contract it has ever given for missile work, \$213,385,000, to the Western Electric Company, funding continued development and testing of the Nike X anti-missile missile system.

This is an incentive type contract. Also covered in the contract will be further testing at Kwajalein Island in the mid-Pacific using components originally developed for the Army's Nike Zeus anti-missile missile system. The tests, involving engagements with target vehicles fired west over the Pacific by intercontinental ballistic missiles launched in California, are providing further data for the accelerated development of the Nike X system. It is an advanced version of the Nike Zeus designed for greater effectiveness as a defense against missile attacks.

Nike X will use components originally developed for the earlier system including the three-stage Nike Zeus missile, in addition to new phased array radar and a second missile, and a high acceleration weapon called Sprint. The contract covers only development and testing at Kwajalein, White Sands Missile Range, N. Mex., and other locations and does not include funds to produce and deploy the weapon system.

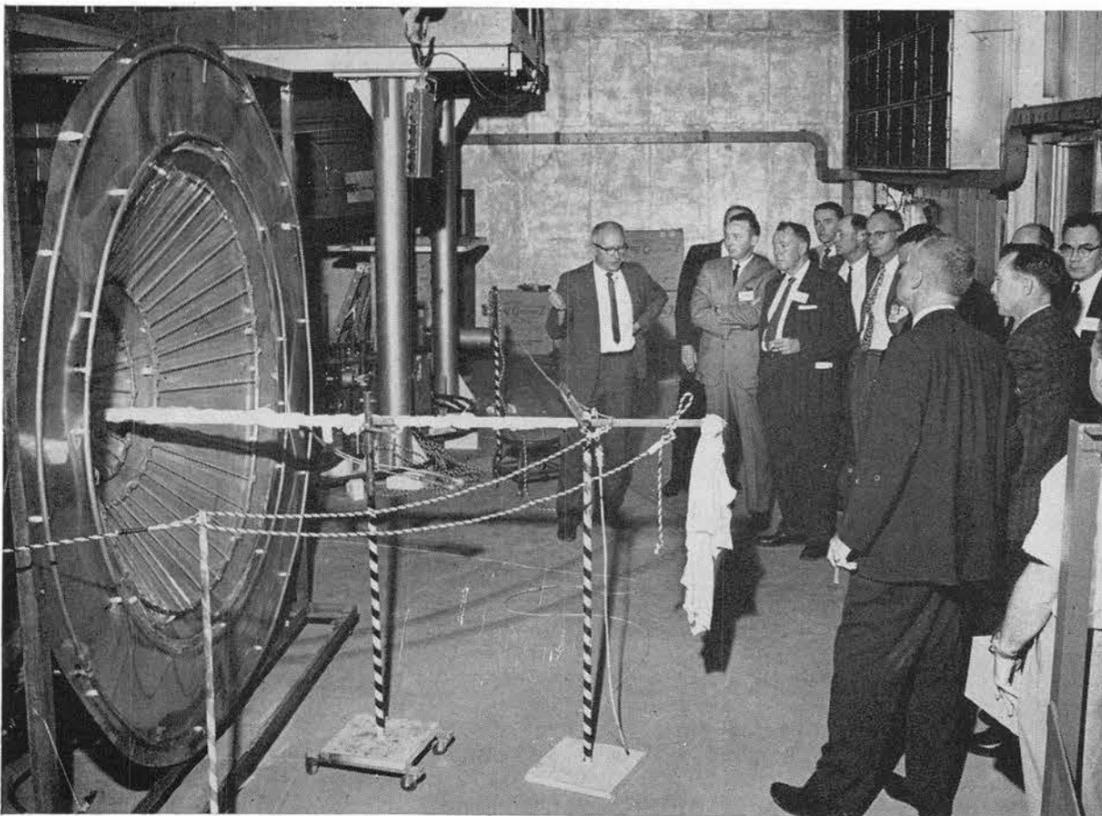
Western Electric Company, the system prime contractor, has major plants in Burlington, Greensboro, and Winston-Salem, N. C.; other Nike X work is performed at company facilities in Laureldale and Allentown, Pa.

System design and development is the responsibility of Bell Telephone Laboratories, Whippany, N. J.

Nike X subcontractors sharing in the funding will include: Avco Corporation, Everett, Mass.; Discrimination Techniques and Studies; Douglas Aircraft Co., Santa Monica, Calif.; Nike Zeus Missiles, Equipment and Engineering Services; General Electric Co., Syracuse, N.Y.; Radar Techniques and Signal Processing Equipment.

Others are: Martin Company, Orlando, Fla.; The Sprint Missiles Equipment and Engineering Services; Raytheon Company, Wayland, Mass.; Advanced Radar Components; Sperry Rand Co., Great Neck, N. Y.; Radars; Sperry's Univac Div., St Paul, Minn.; Data Processing Equipment; Sylvania Electric Products Company, Waltham, Mass., Radar.

The Nike X development program is managed for the Army by Col. I. O. Drewry, Project Manager, and his staff, headquartered at Redstone Arsenal, Ala. The New York Procurement District administrators this contract.



AEC INFORMATION officers from throughout United States visited Sandia Laboratory recently in connection with their annual field meeting held in Albuquerque

and Los Alamos. R. H. Schultz, manager of Environmental Research and Operations Department 7320, explains the Radiant Heat Facility in Area III.

Underground Experiment to Further Detection Means



MODEL of surface details at Project Shoal site near Fallon, Nev., is examined by (l to r) J. A. Beyeler (7251-2), project leader for the Sandia instrumenta-

tion programs at Shoal; P. R. Kintzinger (5412), scientific advisor on surface motion; and W. D. Weart (5412), scientific advisor to the technical director.

Project Shoal, an experiment to improve ways of distinguishing earthquakes from underground nuclear explosions by comparing their signals, is scheduled tomorrow near Fallon, Nev., the Atomic Energy Commission and the Department of Defense have announced.

Some 25 personnel from Sandia Laboratory will participate in the Project. Plans call for firing a nuclear device approximately 1200 ft. underground in an area where natural earthquakes have occurred and are apt to occur again. The force of the explosion will be about the same as that from 12,000 tons of TNT.

The nuclear explosive will be located at the end of a long, hooked tunnel somewhat like that used for the Gnome project near Carlsbad, N. Mex. The tunnel is designed to seal off the area of the detonation at the moment of the nuclear explosion.

Project Shoal is part of the Atomic Energy Commission—Department of Defense program called Project Vela. Sponsored by the Advanced Research Projects Agency, Shoal is designed to improve the capability of the United States to detect, locate, and identify underground nuclear detonations. Information developed through the program will be used as a basis for further negotiations at the continuing Geneva Disarmament Conference.

The specific objective of Project Shoal is to detonate a nuclear device underground in an active seismic area. The measurements which are obtained from the detonation will be compared with measure-

ments obtained from earthquakes of the same energy range located in the same general area. Scientists then hope to be able to make more accurate comparisons between seismic signals resulting from nuclear detonations and those resulting from earthquakes.

Sandia Laboratory is responsible for the following Shoal technical activities: free field particle motion, stress and strain near source; seismic net; hydrodynamic yield measurement; device support, assembly, emplacement, stemming and arming; yield measurement; reentry safety monitoring; reentry collapse; radiation monitors; reentry parties; and technical construction coordination.

The site in the Sand Springs mountain range is in a remote area about 28 miles southeast of Fallon.

Technical director for Sandia programs at Shoal is A. J. Max, supervisor of Test Operations Division 7254. Scientific advisor to the technical director and advisor on sub-surface motion is W. D. Weart of Underground Physics Division 5412. P. R. Kintzinger, also of Division 5412, is scientific advisor on surface motion. J. A. Beyeler (7251-2) is project leader for the Sandia instrumentation programs at Shoal. William H. Kingsley, manager of Environmental Health Department 3310, is the health and safety advisor.

H. M. Miller (7254) will head hydrodynamic measurements. In total, some 25 Sandia personnel from Divisions 3311, 5412, 7214, 7251, and 7254 are participating.



INSTRUMENTATION — L. C. Sandgren, left, and Jim Lohkamp (both 7251) splice cable leading from underground instrumentation canister to trailer located at the site of Project Shoal. The canister contains gauges for measuring velocities, stresses, and strains produced by nuclear detonation experiment. Shot is scheduled for tomorrow.

Continued from page one

National President of SNT

with plutonium involved detailed physical measurements of the components, radiation check for completeness of plating coverage, and autoradiography for internal flaws.

UNM Graduate

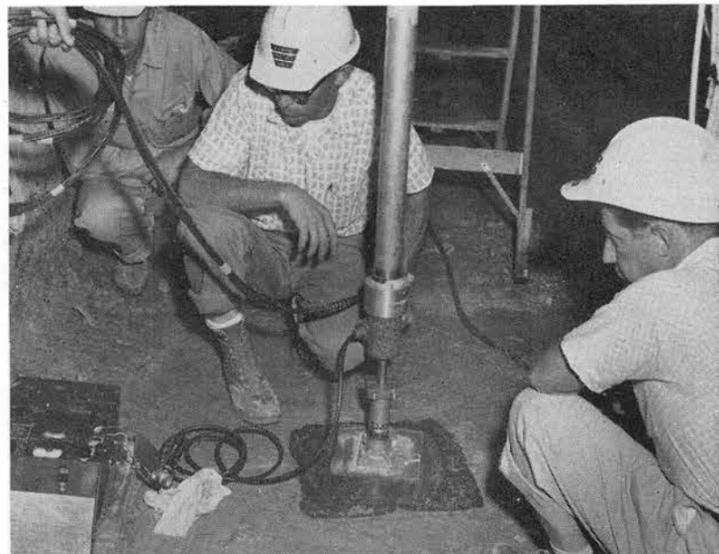
In 1948, Doug left the weapons field to take a position as manager of the Ames Company textile mill in Cleveland. However, his desire to return to the Southwest prompted him to enroll at the University of New Mexico in 1949. He received his BS in mechanical engineering at UNM in 1950 and immediately joined Sandia Corporation. He continued to attend night school at UNM and received his MS in mechanical engineering in 1952.

Doug assumed his present position in 1960 as supervisor of Advanced Manufacturing Development Division 2564. This group's mission is to look ahead three to five years at weapon requirements and to study and propose solutions

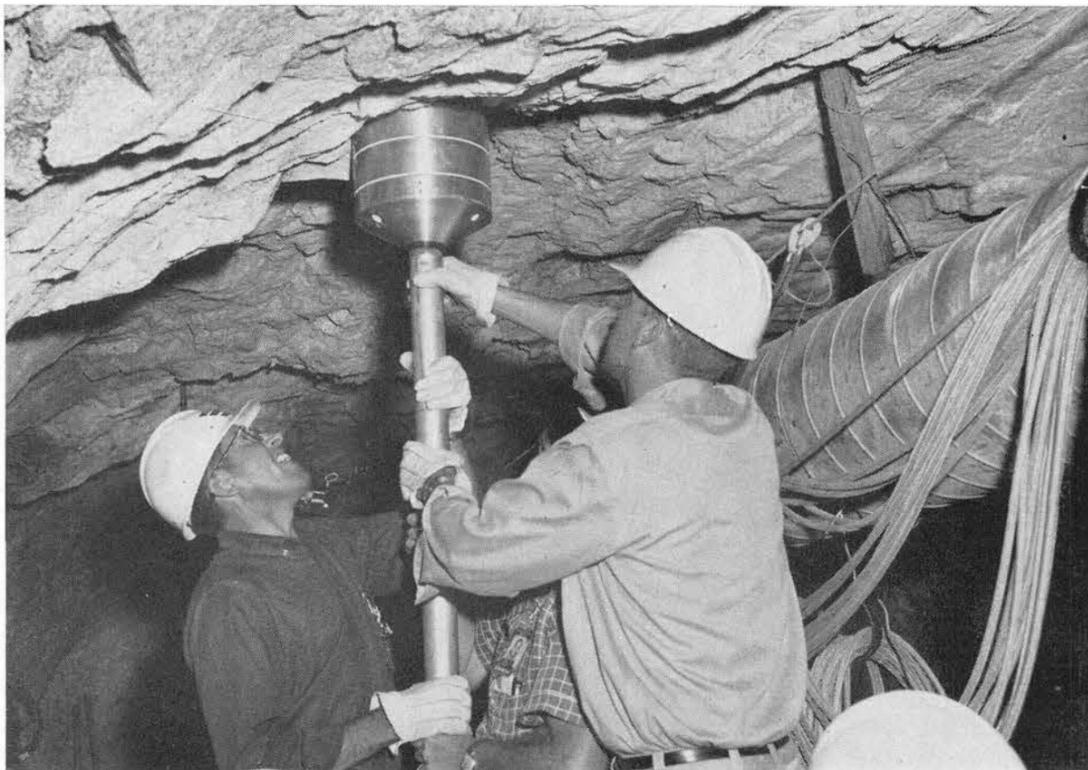
to anticipated manufacturing, inspection, and testing problems. One of the outgrowths of this assignment has been the development of several new production techniques, notably the laminar airflow principle as applied to clean room and clean work stations.

You Can Sleep Later Monday—Work Starts 8 a.m.

An extra half hour of sleep will be available to Sandia Laboratory employees beginning Monday, Oct. 28. Winter working hours will be in effect. Employees will report to work at 8 a.m., the day will end at 5 p.m. for those on regular shifts. Regular noon hour from 12 until 1 p.m. will remain unchanged.



SHOCK WAVE MEASUREMENT — Three Sandia Corporation employees, Carl E. Smith, left; Austin C. Arthur, center, and H. M. Miller (all 7254), check hydrodynamic gauge which will be used in measuring speed of shock wave produced by nuclear explosion during Project Shoal experiment Oct. 26 near Fallon, Nev. The gauge is one of many located along shaft leading to the detonation point 1200 ft. underground.



PROJECT SHOAL MEASUREMENTS — Three Sandia Corporation employees, George Curry (7254), left; Hervey L. Hawk, Jr. (5412), center; and Carl E.

Smith (7254) install a hydrodynamic gauge which will be used in measuring speed of nuclear explosion shock wave produced by Project Shoal experiment.



NEW LUNCHEON BUFFET at the Coronado Club features a variety of entrees and, as the sign says, "all you can eat for \$1." Peggy Wheeler (1433) is one of the satisfied customers. Regular cafeteria and sandwich service is also available during noon hours at the Club. At right is Sandy Linn, Club employee.

Sandia Gun Club's Winter League Pistol Competition Starts Oct. 30

New winter league competition is starting for members of the Sandia Gun Club, reports J. W. Langenhorst (1411), director of pistol activities for the club. A membership drive is also underway, Jim says, and anyone interested in shooting is welcome to participate in club activities.

The annual "900" Aggregate Match was held Oct. 19 at the Sandia Base Outdoor Range. Pistol competition was held in three classes—.22 caliber, center

fire, and .45 caliber. The winter league pistol competition will start Oct. 30 at the Kirtland Indoor Range. Twelve weekly meets will be held. Practice sessions are scheduled Tuesday evenings at the Sandia Base range.

The small-bore rifle handicap league started Oct. 21 at the Sandia Base Indoor Range.

Anyone interested in participating should contact Jim, tel. 298-3595.

Welcome Newcomers

Oct. 7-18

Albuquerque	
Judith P. Bateman	4622
Delores A. Downs	3153
Donna Jo Finley	3126
*Cynthia Hanna	3421
Thomas B. Hobart	3427
David G. Kitzinger	7412
Sharon K. Moore	3126
Rey E. Smith	3126
Illinois	
Patrick R. Farina, Chicago	4224
Pennsylvania	
Bob Lee Grepory, Pittsburgh	5311
Allan R. Sattler, Philadelphia	5311
Returned from Leave	
Jeanette B. Passmore	4431
Charles Stein	1124

*Denotes rehired

Visit to Auld Sode Reminds Nora Why Ireland is Green

If Nora O'Neill sounds mighty "Irish" these days, blame it on her recent extended visit with family and friends in Ireland.

Nora (who is secretary to C. W. Campbell, 4000) lived in Ireland until she was 20, and eight years had passed since her last visit. "Relatives came from every direction," she recalled. "The children have grown up, but I don't feel a day older!"

Her brother lives in a farming community in County Cork—"as far south and almost as far west as you can go." Improvements in farming are quite noticeable. "Farmers used to do most of their work the hard way—by hand—now much is automated," she said. Her mother, two brothers and two sisters, along with their families, live in the Cork County.

Also evident was the increased cost of living, due partly to last summer's heavy influx of tourists. "Petrol sells for 75 cents a gallon, cigarettes 50 cents a 'twenty pack.' In contrast, one can get an excellent meal for \$1.50, and decent bed-and-breakfast accommodations for around \$4 even at the attractive tourist sites," Nora said. "Motorists can enjoy an excellent highway system. Even narrow roads through the remote hilly country are black-topped and well marked"

While in County Cork Nora fished for mountain trout, and attended several regattas and accompanying "feis" (a sort of fiesta complete with field sports).

She also visited Galway and Mayo in the northwest area and the Aran Islands, where Gaelic is spoken almost exclusively. This area is known for its thatched roof stone cottages and simple way of life.

"It was most heartening to see many of the old fourteenth and fifteenth century castles being restored throughout the country and the future holds great promise for these places as tourist attractions,"

Nora said. In Dublin she saw the All Ireland Final Hurling Championship game and the Dublin Horseshow before traveling on to London, Paris, Rome, and Lourdes.

"I know now why Ireland is so green," Nora said. "Man, did it rain!"

Sandia Lab Hosts Two-Day Meet of Health Physics Group

About 100 persons attended a two-day meeting of the Rocky Mountain Section of the American Industrial Hygiene Association and the Rio Grande Section of the Health Physics Society at Sandia Laboratory last week.

R. B. Powell, Vice President, Personnel, welcomed the delegates and W. H. Kingsley, manager of Environmental Health Department 3310, introduced the speakers, which included a number of Sandians. Special features of the convention included a tour of the Lovelace Foundation Laboratory and a banquet with talks given by E. C. Hyatt of the Los Alamos Scientific Laboratory Health Division and Robert F. Bell, M.D., of the University of Colorado Medical Center.

Technical papers written by Sandians and presented at the meeting included: "Operation Roller Coaster" by J. D. Shreve, Jr. (5414); "Control of Beryllium Hazards in a Fire Test Series" by R. J. Everett and R. O. Mills (both 3311-1); "The Spectrochemical Determination of Beryllium in Swipe Tests" by D. E. Wanner (1122) and R. O. Mills (3311-1); "Health Physics Aspects of Operation Roller Coaster" by H. L. Rarrick and W. D. Burnett (both 3311-2); and "Krypton-85 Calibration of Air Monitors Calibrated for Tritium" by G. E. Tucker, Jr. (3311-2).

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

- BABY BED; car seat; high chair; Infant-seat; bathinette, bassinets. Earlywine, 299-2835 after 5:30 p.m. weekdays.
- '57 RENAULT DAUPHINE, \$150. Bauer, AL 5-7774.
- '61 VW SEDAN, \$1200; 19 cu. ft. freezer, \$70; 2 steel GI cot frames, \$5 ea. Hawk, 1821 Florida NE, AL 6-6264.
- '56 ROADMASTER BUICK 4-dr., \$325; 45x150" lot on Edith near Menaul. Brown, DI 4-6831.
- DAVENPORT, CHAIR, Kroehler, sound springs and frame, needs upholstering or slip covers, \$75. Gillespie, AL 5-6421.
- 26" BOY'S BIKE w/light, padlock, front and rear carriers, \$30. Reynolds, 299-7832.
- '55 PONTIAC HARDTOP COUPE, R&H, w/w tires, \$350. Wilson, AX 8-0049.
- "K" ELECTRIC GUITAR w/3 in-put amplifier, \$125; Knight stereo system w/individual matching speakers, \$90. Rauch, 268-0232.
- FASCINATION POOL TABLE w/cue sticks and balls. Blain, AL 6-7114 after 5 p.m.
- IRONERS, 1 Maytag, \$15; 1 Ironrite, \$25. Bahr, 256-7452.
- '56 CHEVROLET 2-dr., 6-cyl., straight stick, \$350. Zachewicz, CH 2-1396 after 5 p.m.
- BRYANT 30-gal. electric hot water heater, \$25; Hotpoint 9.6' refrigerator, \$32.50; Grand Champion, registered Half-Arabian mare in foal. Galbreath, 898-0644.
- ELECTRIC TRAIN SET, board w/track, power pack, HO Gage by Revell; Shetland pony, black and white, for ages 4-12. Kinaschi, AL 6-0531.
- GAS RANGE and oven, \$60; baby scale, \$8. Kotaski, AX 8-1732.
- '58 PONTIAC STARCHIEF 2-dr., HT, PS, PB, R&H, \$800 or trade for Volkswagen. Silva, 877-2874.
- NEW UPRIGHT GUN CABINETS, glass door, large drawer, light or dark wood, \$32.50; large jig saw, complete, \$47.50. Morgan, 299-2850.
- SPEAKER ENCLOSURE, unfinished w/12" speaker, size-22hx18dx18w, \$12. Stueber, AX 9-2414.

- 10 ACRES wooded, on country road, borders national forest, just west 217. 4.4 miles south 66, \$2500. Ray, AX 9-1330.
- BICYCLE, boy's 26", \$11.50. Summers, AX 9-4674.
- '55 CHRYSLER NEW YORKER, 4-dr., 4 new w/w recaps, power, \$300. Grant, 255-0576.
- CAMERA, Argus C3, '62 model w/case and flash attachment, \$20. Weber, 344-5183.
- SKIS, 6', laminated, steel edges, bindings; ski boots, size 7; ski poles, all for \$15. Winter, 299-4746.
- KEROSENE TENT STOVE, \$10 Causey, AX 9-0089.
- ONE-WHEEL UTILITY TRAILER. Timmons, 255-5933.
- 18" JIG SAW, Craftsman w/stand and motor, \$40. Liguori, AL 6-3613.
- NEW George Steck studio piano, take over payments or cash value \$800. Starrett, 256-0862 between 5-7 p.m.
- SIAMESE CATS, 2 male, 3 female, \$20 ea. Gammill, AX 9-4702.
- MOTOROLA CAR TRANSMITTER FMT-30D (A), receiver FMAR-13V(A) w/microphone, antenna, control panel and cables, \$35. Smitha, AX 9-1096.
- 3-BDR. MANKIN, hw/floors, built-in range-oven, pitched roof, on cul-de-sac near shopping and bases, take over 4 1/2% loan or refinance, \$12,500. Patterson, AX 9-6590.
- '62 VOLKSWAGEN MICROBUS Deluxe model, \$1995; '55 1 1/2-ton Chevrolet truck w/1000 gal. water tank, \$850, terms. Norton, 282-3165.
- MAN'S DIAMOND RING, \$200. Sullivan, 298-0148.
- '53 PONTIAC station wagon, new tires. O'Connor, DI 4-7859.
- UTILITY TRAILER, 4'x6' metal box, stake sides, new 15" implement tires, 1000# over-load springs, light, licensed, \$85; metal car-top carrier, \$7. Brady, 299-6037.
- TYPEWRITER, Royal upright, old model, \$30. Jolly, TR 7-2474.
- '53 BUICK ROADMASTER station wagon, best offer. Lopez, AX 8-1621.
- 3-BDR, a/c, walled yard, gates, carpets, new paint inside and out, landscaped, \$84 month. Hawn, AX 9-8335.
- 3-BDR, 1 1/2 bath, built-ins, carpeted, double garage, covered patio, FHA or assume VA 4 1/2% loan. Isidoro, 2125 Erbbe NE, AX 9-7495.
- BIRMINGHAM db. shotgun over 70 yrs. old, \$15; complete aquarium: fish, plants, light, filter and pump \$15. Cotter, 256-1333.
- '59 BISCAYNE CHEVROLET 4-dr. sedan, \$795. Roller, 10810 Claremont NE, AX 9-4661 after 5 p.m.
- GARAGE DOOR, overhead sectional, 8 x 7 w/springs and frame, complete, \$10. Castle, 299-0077.
- OAK PLAYPEN, crib mattress and cover, folding stroller, \$12. Miller, AL 6-6020.
- DARK OAK BUFFET, \$7.50; umbrella clothes line, \$5; Painted dinette table w/4 chairs, \$7.50; gas range, \$50. Hauer, AM 8-3885.

NEXT DEADLINE
FOR SHOPPING CENTER ADS
Friday Noon, Nov. 1

- 3-CUSHION COUCH, \$35; beige Mouton jacket size 10, \$40, originally \$110; formal cocktail dresses, size 11-12, \$5 each. Hatfield, 256-9281.
- GOLF CLUBS, BAG, matched irons 1-8, matched woods, 1-3, matched swing and weight, woods have head mitts, \$35. Simmons, DI 4-4527.
- CROSLEY 17" TV, needs picture tube, \$5. Reinman, AL 6-9737.
- '63 FORD GALAXIE 500 2-dr. HT, 390 engine, Cruisomatic trans., R&H, w/w, PB, PS. Schulze, 242-8388.
- HOTPOINT AUTOMATIC electric clothes dryer w/temp. control, \$30. Gustafson, AX 9-3270.
- MIRROR w/marble and wood, for entry hall, \$20. Norvill, 255-2787.
- 2 STEP TABLES, mahogany w/formica tops, \$15; Thayer buggy, converts to car-bed, \$15; baby feeding table, \$10; Trimble bathinette, \$10. Still, 298-3005.
- '52 PLYMOUTH convertible, R&H, \$100. Carter, 877-1485 after 6 p.m.
- PLATINUM WEDDING BAND w/10 small diamonds, \$75; portable Singer sewing machine, \$35; antique dining chair, \$25. Cone, AL 6-2583.
- '62 GREAT LAKES MOBILE HOME, 2 bdr., 55'x10' w/18' extendo living room, air cooler, fence, carpeted. Henneke, 298-4232.
- '59 RAMBLER American station wagon, automatic transmission; Viking Ranger transmitter. Cummings, 298-6042.
- ROLLERSKATES, white, size 6 1/2; overhead garage door and/or hardware; 2 venetian blinds w/curtain rods, 57" and 67". Gardner, 255-4452.
- 35' COLUMBIA TANDEM trailer frame only, complete w/wheels, tires and electric brakes, \$325. Cupp, 299-8724 or 299-5924.
- WORK BENCH, 2x5', wood flake top, metal legs, \$20; large plywood case w/handle, \$5. Young, 4614 Burton, SE.
- SINGLE BED w/innersprings and padded headboard, \$20; gas space heater, 17,000 BTU/HR, \$12. Berger, 298-4234.
- 12x16' gray wool carpet and pad; dark green club chair, best offer. Scheaffer, AL 5-9473.
- KNUTH heavy duty juicer, shredder-press combination, \$90 or make best offer. Gustin, 712 Adams SE, 256-3807.
- HAMMOND CHORD ORGAN w/reverberation unit; Kodak 8mm movie projector; Kenmore automatic washer. Osterby, 299-4606.
- '60 CHRYSLER 4-dr. sedan, PS, PB, low mileage; Bundy B Flat clarinet. Bechtel, 268-7409.
- '57 CHEVY V-8, 4-dr., OD, floor shift, radio, new whitewalls, \$675. Small, AX 9-0023.

- CHEST, Mr. and Mrs. type, pine wood, light maple varnish finish, \$18 or best offer. Duvall, 299-8744.
- LADIES WINTER COAT w/zip in lining, light blue, size 14, \$25. Scranton, 299-4902.
- '51 JEEP station wagon, rebuilt engine, transmission, new nylon truck tires, newly repainted, upholstered. In good shape for immediate sale. Draper, 268-2395.
- '60 VALIANT 4-dr., auto. trans., belts, push-button radio, 39,000 miles. Wever, 298-3266 evenings.
- AMPLIFIER \$55; Garrard Changer, \$25; FM tuner, \$25; 2 Acousti-Craft walnut enclosures w/Warfedale speakers, \$60/pr; all for \$150; 3-band radio receiver in walnut enclosure, \$12. Browning, AX 9-6384.
- '32 WINCHESTER SPECIAL w/case, \$60; '55 Chevy Bel Air 4-dr., auto. trans., \$425. White, AL 6-3077 after 5 p.m.
- '60 FORD GALAXIE V-8 2-dr., R&H, standard trans. w/OD, \$1145. Swanson, 298-0425.
- '57 CHEVROLET V-8 4-dr., std. trans. Needs light mechanical work, \$400. Taffoy, 840 Loma Hermosa NW, 243-7277.
- BOOK OF KNOWLEDGE, \$10 or best offer; Westinghouse roaster, \$20; parade drum, \$20. McDonald, 256-6929.
- '57 FORD FAIRLANE 500, T-Bird engine, radio, automatic transmission, PS, make offer. Chavez, AX 9-5102.
- '53 CHEV. CONV., rebuilt motor and trans., good top, 4 new tires, new battery, R&H, \$310. Rogers, 898-2364.
- REVELL TRAIN SET, complete w/track, houses, stores, lights and scenery, completely assembled. Martin, AX 8-2064.
- REGISTERED TENNESSEE WALKING HORSE gelding, \$200; Allis Chalmers model WC tractor, \$75. Ault, BU 2-3280.
- BEEF CALF, \$90. Tatum, TR 7-0997.
- BICYCLE, boy's 26", thorn proofed, basket, light, \$15. Stixrud, 298-0478.
- A.Q.H.A., 2 young permanent registered fillies, Good King, Poco, and Oklahoma Star bloodlines, excellent conformation and disposition. Drannon, TR 7-9144 or TR 7-2474.
- '57 PONTIAC CHIEFTAIN V-8, 2-dr., PS, a/c, low mileage, new tires, \$650. Shaw, 268-6355.
- 30-06 REMINGTON RIFLE and case, \$120. Jones, 298-0969.
- '59 FORD station wagon, w/w, R&H, 35,000 miles, one owner, oyster white, blue interior. Herrmann, 11003 Woodland, NE, AX 9-5598.
- BRICK HOUSE, 2150 sq. ft., 3-bdr., 1 1/2 baths, den, fireplace, kitchen, utility, dining, living rooms; sunken patio, blast shelter, carpet, drapes, \$31,950. Dossey, AL 6-0857.
- '62 OLDSMOBILE STARFIRE, 8000 miles, will consider trade, must sacrifice. Blylock, AL 6-0734.
- '62 MODEL TOTE GOAT, used in town only, \$225; Coleman double wall heater, 50,000 BTU, \$25; Ward's wall heater, built-in thermostat, \$25. Lucero, CH 8-7517.
- '49 CHEVROLET 2-dr., \$65. Beatty, 299-3429.

- 3-BDR. HOME, corner lot, refria. a/c, hw/floors, carpet, 4 yrs. old, landscaped, carport, storage room, 1 1/2 bath, fa heat, near bus, schools, shopping. Sanchez, 242-0325.
- '59 FIAT 1100, 4-dr., heater, new recaps, \$400. Frindt, AX 9-0283.
- PHILCO FREEZER, small chest freezer, approx. 10 cu. ft., \$75. Lane, AX 9-9329.
- 17" GE table model TV, wood grained metal cabinet, \$25; high fidelity tape recorder, 3 speakers, ceramic mike, \$40. Schafer, 299-6217.
- DELUX TRANSISTOR RELAX-A-SIZOR w/ carrying case, complete, \$200 or best offer. Perry, 265-0859.
- WANTED**
- RIDE from Aloha Village Mobile Home Court, vicinity Yale and Gibson, to bldg. 880. Hunt, 243-0162.
- WOULD LIKE to keep girl 3-5 in my home as playmate for my child, Holiday Park vicinity. Pannell, 298-3338.
- USED WINDMILL TOWER, motor and pump. Stueber, AX 9-2414.
- HOMES FOR KITTENS, 9 weeks old, weaned, housebroken. Smeltzer, AL 6-3908.
- BOY'S 20" bicycle w/balloon tires, need not be complete or in running condition. Summers, AX 9-4674.
- RIDE to bldg. 802 from vicinity Central and San Mateo, 312 La Veta Dr. NE. Hatfield, 256-9281.
- CHILD CARE in my home vicinity of Menaul and Eubank, good references furnished. Gross, 9501 Woodland NE, AX 9-6872.
- HOMES for 3 kittens, free delivery. Tatum, TR 7-0997.
- USED WHEEL BARROW, crow bar, pick axe. Collins, AM 8-3612.
- WOULD LIKE TO SHARE 2-bdr. house, completely furnished, near Sandia Base. Laskowski, AL 6-2053 after 5 p.m.
- ADDING MACHINE; metal file cabinet. McDonald, 256-6929.
- FOR RENT**
- LARGE HOUSE on ranch, Placitas area, modern conveniences, garage, separate contract for small orchard and vineyard operation available. Illing, 299-7378.
- 1-BDR. HOUSE on corner of Virginia and Trumble SE, partly furnished w/stove, refri., couch and chair, dinette \$55/mo. plus utilities. Sanchez, 298-7103 after 5 p.m.
- LOST AND FOUND**
- LOST—Lady's gold watch, Sandia briefcase w/name Pete Komen, plane ticket, keys on white wire, large black handle knife, silver link bracelet, glasses in leather case, red banlon sweater, 9' white cord for viewer, lady's green wallet, brown Dr. Grabow pipe, billfold w/ID of Jerald Wilson, tortoise rim sunglasses in Vertz optical case, flat brass pencil. LOST AND FOUND, ext. 29157.
- FOUND—Ring MHS-1958, lady's Hamilton watch, cuff link w/working gears, silver and turquoise cuff link, gold barret, pencil and ball point pen in case, silver disc engraved Gary. LOST AND FOUND, ext. 29157.



CURRENT JAYCEE PROJECTS are discussed by (from left) Al Winkeljohn (7413), Don Butel (1542), Jon Bedingfield (4325), and Dick Bemis (1412). The Sandians are four of the 200 members of the community-minded Albuquerque Junior Chamber of Commerce. The group meets every other Monday at City Club.

Sandians Who Serve . . .

Albuquerque Jaycees Work for Community Development, Progress

The Albuquerque Junior Chamber of Commerce is a young men's organization dedicated to community service and development. Among its 200 members are four Sandians who take an active part in Jaycee civic programs and activities for youth.

Al Winkeljohn (7413) is a member of the Jaycee Board of Directors with a portfolio of projects under his direction.

"The director's job is to find a chairman for each project and to assist in an advisory way until the project is completed," Al says. "The Jaycees believe in giving a man responsibility to develop his leadership abilities. This training is invaluable, both to the man and to the community. In completing his project successfully, the Jaycee makes a contribution while gaining personally in experience and confidence."

Several Projects

Al chaired several projects before being elected to the Board. Notable among these was PAL (Project Against Leukemia). The Jaycees "adopted" a leukemia patient by providing his entire needs for blood transfusions.

Don Butel (1542) has been an active Jaycee for the past six months. Turning his attention to the internal structure of the Jaycee organization, Don inaugurated a new personnel policy. He made a complete inventory of the skills and interests of Jaycee members and set up a card file of manpower. The system helps project leaders in selecting members of committees and helps officers find leaders for new projects. All Jaycees are expected to chair at least one project and serve as workers on others.

Don served recently on a "manpower project"—he was one of the Jaycees directing parking during the recent New Mexico State Fair. This was a "money-making" project which provides funds for another important area of Jaycee interest—youth activities.

Dick Bemis (2412) carries the responsibility for several of these projects—Jaycee-sponsored tournaments for youngsters in golf, tennis, physical fitness, and promoting Youth Sports Week. Winners of local tournaments compete in state, regional, and national tournaments.

Boy Scout Work

Last summer Dick was one of the Jaycee members who worked with the Boy Scouts in organizing 12 new troops in the west side of Albuquerque. Dick contacted other civic and church organizations in the area and helped them become sponsors of Boy Scout troops.

Dick also serves as a "Jaycee Greeter" during the bi-weekly dinner meetings. He introduces new members and helps them find positions on committees and project staffs.

In this way, he helped Jon Bedingfield (4325), a Jaycee member for the past three months, find a slot on a Jaycee committee surveying the possibilities of founding a new Boy's Club in the Heights area. The Albuquerque Jaycees were instrumental several years ago in organizing the first Albuquerque Boy's Club.

Other Projects

Current Jaycee projects include selecting the Outstanding Young Farmer in the Albuquerque area, planning for an Invitational Indoor Track Meet in January, a Christmas Basket project for needy families, a Christmas Party for the All Faiths Receiving Home, a Golden Gloves tournament, and selection of an Albuquerque Miss Junior Miss. Long-range plans include the establishing of a lake and recreation area south of Albuquerque.

"Jaycee projects range far and wide," Dick Bemis says. "We try to help in areas of need and provide necessary services. Naturally, we are looking for new members. Any young man between the ages of 21 and 35 is eligible for membership."

Dick invites anyone interested to call him, tel. 268-6376.

J. C de Baca to Retire from Sandia First of November

Jose C de Baca, a Sandia employee for 12 years in Janitor Service Division 4574, will retire Nov. 1.



Mr. C de Baca has been in poor health since last March and has been on leave of absence for more than two months.

Mr. and Mrs. C de Baca reside at 536 Vermont NE with two of their five children.

In later months, Mr. C de Baca hopes to do a limited amount of gardening and to enjoy the company of his grandchildren.

Sandia Authors

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

R. W. Harris (5413), "First-Order Effect of Magnetic Moment Non-Conservation for Geomagnetically Trapped Particles," Sept. 15 issue, *Journal of Geophysical Research*.

A. T. Fromhold, Jr. (5151), "Kinetics of Oxide Film Growth on Metal Crystals, Part I. Formulation and Numerical Solutions," September issue, *Journal of Physics and Chemistry of Solids*.

H. J. Stein (5311), "Temperature and Illumination Dependence of Irradiation Damage in Silicon," June 15 issue, *Applied Physics Letters*.

P. B. Bailey and G. M. Wing (both 5421), "A Correction to Some Invariant Imbedding Equations of Transport Theory Obtained by 'Particle Counting,'" forthcoming issue, *Journal of Mathematical Analysis and Applications*.

P. B. Bailey (5421), "A Rigorous Derivation of Some Invariant Imbedding Equations of Transport Theory," forthcoming issue, *Journal of Mathematical Analysis and Applications*.

B. T. Kenna (1122) and L. A. Kenna, Electronic Proving Grounds, Ft. Huachuca, Ariz., "A Simplified Method for Determining Sensitivities in Activation Analysis," October issue, *Analytical Chemistry*.

WE President To Be Honored For Equal Opportunity Work

The National Urban League's 1963 Equal Opportunity Day Awards will be presented to H. I. Romnes, President, Western Electric Company, for his outstanding contribution toward the Urban League's goal of equal opportunity. The award will be made at a dinner Nov. 19 at the Waldorf-Astoria Hotel in New York.

This announcement was made by Martin E. Segal, dinner chairman and president of Martin E. Segal Company.

This year's event will mark the 100th anniversary of Lincoln's Gettysburg Address and the centennial of the Emancipation Proclamation. The annual Equal Opportunity Day dinner has been held traditionally since 1956. It takes on very special significance this year.

The goal of \$100,000 to be raised from this dinner will be set aside as a special centennial gift to meet current demands for League consultant services as a result of today's social revolution and the upsurge for securing equal opportunity for negro citizens.

Last year's dinner was attended by more than 1400 persons representing a cross-section from all walks of life, commerce and industry, labor, government, civic and fraternal organizations, plus hundreds of individuals who support the League's nation-wide program in 65 strategic industrial areas.

The League's expanded services and program will help reduce racial tension and create the kind of climate for qualified negroes to secure more and better jobs and training.

Local IEEE Journal 'The Blast' Product of Sandia Engineer-Editors

A voice in a clipped British accent was saying ". . . I like your title 'The Blast' because it has impact and gives the connotation of dynamic nuclear power."

The taped comment was part of a professional evaluation by a British industrial editor of the bi-monthly magazine published by the Albuquerque Section of the Institute of Electrical and Electronics Engineers. Listening intently were Sandia engineers Allen B. Church and Phillip H. Bircher, and several members of Theta Sigma Phi, women's journalism fraternity, which is responsible for layout and production of the publication.

Phil, who is supervisor of Systems Analysis Section III, 7513-3, has been editor of "The Blast" for the past three years and Allen, supervisor of Semiconductor Components Section 1433-1, will take over the job on Jan. 1.

Formerly Mimeographed

They succeeded a number of Sandians who have been responsible for gathering material for the publications since its growth from a mimeographed sheet to a glossy-paged magazine in 1954. Former editors include Herman B. Goldenberg (7513-1), H. H. Patterson (1530), George Arnot (1422-3), and T. F. Marker (2420).

The editors have tried to devel-

op a content of articles of general interest plus specialized articles with good summaries, reviews of pertinent books, and, occasionally, photos of recent IEEE social activities.

"The Blast" fills the vacancy between the direct mail meeting notices and the national organization's scholarly journals.

Changes have occurred through the years. Right now, a re-designed cover is under discussion to better utilize this valuable space. Also, Allen plans to review Section meetings in "The Blast" since members are scattered throughout Albuquerque, Santa Fe, and Los Alamos. Reporters will later be assigned to write about the professional meetings.

Widely-Circulated

Phil's previous journalistic experience was as editor of his high school's bi-weekly newspaper. He has been a member of IEEE (and IRE before the merger) since 1950.

Allen has been a member since 1954 and has served as chairman, vice chairman, and treasurer of the Section.

Although circulation of "The Blast" is only 1500, some copies cover an amazing distance. One Sandian, visiting Hawaii, reported that a public service company employee on the Islands had a current copy.



ENGINEER-EDITORS Allen Church (1433-1), left, and Phil Bircher (7513-3) examine a copy of "The Blast," bi-monthly publication of the Albuquerque Section, Institute of Electrical and Electronics Engineers.

Sandia's Safety Record

Sandia Laboratory HAS WORKED

1,225,000 MAN HOURS OR 35 DAYS WITHOUT A DISABLING INJURY

Livermore Laboratory HAS WORKED

925,500 MAN HOURS OR 180 DAYS WITHOUT A DISABLING INJURY