

INVENTORS H. E. Widdows (left) and I. T. Holt examine designs for a flotation gear/parachute system and photographs showing skin divers recovering a missile with the system in operation.



CUTAWAY of omnidirectional switch is examined by inventors D. F. Wilkes (left) and R. A. Randall. The electric switch is responsive to fractional net acceleration levels regardless of orientation to the surface of the earth.

Patent Awarded For Invention of Flotation Bag

A patent for a Ram Air Inflated Flotation Bag has been assigned to the AEC in the names of I. T. Holt and H. E. Widdows, both of Sandia's Engineering Aerodynamics Division.

Recovery areas for missiles and similar items are normally located over water because of lack of inhabitants and minimum damage to components and contents upon impact. However, there is difficulty in locating these vehicles and in preventing them from sinking beyond a normal recovery depth. Attempts to buoy such vehicles have met with only limited success because of the excessive space required for storage in the missiles, weight, and low reliability of previously-known devices.

This invention provides a parachute arrangement with flotation gear self-filled by the fluid medium through which it moves. The buoying system is relatively lightweight, inexpensive, and of highly reliable construction.

The system was tested satisfactorily on three rockets sent aloft some 200 miles and recovered off Kauai, Hawaii.

The patent is number 3,161,896.

Patent Awarded for Switch Invented by Two Sandia Engineers

A patent for an Omnidirectional Switch has been assigned to the AEC in the names of R. A. Randall of Power Supplies Development Division and D. F. Wilkes of Advanced Development Division.

The invention relates to an electric switch responsive to net acceleration regardless of the orientation of the body carrying the device or forces tending to nullify normal gravitational forces (such as occur during free fall, ballistic trajectory, or orbital flight).

Net acceleration levels less than the acceleration of gravity (or 1 g) are becoming increasingly important in propulsion and space programs. This omnidirectional switch is capable of sensing and performing a control function under fractional g conditions even when not continually oriented in such a position to properly sense the net accelerations.

The fractional g switch is compact, lightweight, and highly resistant to shock and vibration.

The patent is number 3,161,736.

R. S. Cox Chairman Of Seminar Sponsored By AMA in Chicago



R. S. Cox, supervisor of Cost Division, will be chairman of an orientation seminar on "Principles, Techniques and Skills in Systems Planning and Analysis" in Chicago, Jan. 18-22.

The seminar is sponsored by the American Management Association.

During the seminar, Mr. Cox will present two lectures: "Organizing for System Studies" and "Facts Gathering and Charting."

Sandia Laboratory Team Develops New Flash X-Ray Machine--World's Largest

As a result of international cooperation and the innovations of a Sandia Laboratory project team, the world's largest flash x-ray device, in terms of output dose, is now in operation in Reactor Building 6588.

The device has produced 20.4 rads at a meter from the target and may eventually produce up to 50 rads in pulses of 30 nanoseconds duration, project leader Ken Haynes of Radiation Effects Division believes. (Twenty rads is about equal to the total dose of 1000 chest x-rays. Thirty nanoseconds is the amount of time required for light to travel 30 ft.)

Ray Clark and Paul Beeson are the other members of the project team.

With the exception of the power supply, which was highly modified, team members themselves designed, developed, and in most cases, fabricated components of the flash x-ray.

Work on the new device began last April when Ken returned from a visit to England. The Sandia device is based on an English design. Ken's group first "fired" the device in November.

"There was a loud bang as the capacitors discharged, the water on the surface of the generator tank rippled, and we set the world's record for output x-ray dose," Ken says. "Naturally, we felt pretty good."

X-rays produced by the machine are similar to gamma radiation. The machine will be used to study transient radiation effects on electrical components. "Because of its large output dose, the machine also will be useful," Ken says, "for testing large electronic circuits as well as systems. We've already had inquiries from groups within the Company regarding the machine's availability."

Providing the energy for the flash x-ray

SANDIA CORPORATION

LAB NEWS

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



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National Reliability Award Goes To Sandia Laboratory's A. D. Swain



The 1964 National Reliability Award was presented to Alan D. Swain of Sandia's Development and Systems Division during the banquet of the 11th National Symposium on Reliability and Quality Control, Jan. 13, in Miami Beach, Fla.

The honor was in recognition of Mr. Swain's contribution to the field of reliability as represented in his paper "Human Factors in Design of Reliable Systems," presented last January at the 10th national symposium in Washington, D.C.

W. H. Rombach, general chairman of the symposium, in a letter noted that the selection of Mr. Swain for the honor was unanimous by the Paper Review Committee. The attendees at the 10th symposium also cast their ballots overwhelmingly in approval of this particular paper and presentation.

The paper promoted the idea of redesigning procedures and equipment to minimize or eliminate certain types of human errors rather than assigning blame to those persons who make the errors. The talk is available as Sandia Corporation Reprint No. 74.

In addition to Mr. Swain, several other Sandia Corporation employees participated in the symposium. On Jan. 12, L. J. Pad-

dison, Director of Product Test Equipment Development, was moderator of a discussion of "Design Techniques." C. H. Purdue of Reliability and Engineering Design Practices Division presented a paper entitled "Computer Aided Circuit Reliability Analysis," which discussed time saving by computer circuit analysis, including applications of NET-1 computer program. Co-authors of the paper were B. O. Allen and D. R. Blazek of the same division. C. F. Bild, Director of Materials and Process Development, presented a paper entitled "Failure from a Materials Point of View."

D. W. Ballard of Advanced Manufacturing Development Division presented a paper, "Nondestructive Tests Role in Reliability Programs," on Jan. 13. It discussed non-destructive test methods in the light of increasingly demanding performance requirements for nuclear and aerospace components.

The board of directors sponsoring the symposium included Mr. Paddison, representing the Institute of Electrical and Electronics Engineers Group on Reliability, and Mr. Ballard, representing the Society for Nondestructive Testing. A. C. Littleford of Reliability and Engineering Design Practices Division was an area chairman for the publicity committee. Mr. Littleford also presented a paper entitled "Design Analysis: An Effective Reliability Tool."

is a 20 kilojoule capacitor bank. The capacitor bank charges the generator in two and one-half microseconds. The generator is then fired to produce a high voltage pulse at the x-ray tube.

The generator section of the device is composed of 23 strip transmission lines made of thin sheets of copper separated by polyethylene and submerged in a tank of demineralized water, which functions much like the oil in a transformer. The strip lines, 10 ft. long and 26 in. wide, are more efficient than coaxial cable would be.

The tank, 40 in. wide, 44 in. deep, and 14 ft. long, that holds the generator has hollow fiberglass walls filled with freon gas which give additional dielectric strength.

"Before the flash x-ray can become a regular testing facility, there are a couple of problems to be solved," Ken says. "The device generates tremendous electrical fields from the four-megavolt, 40,000 ampere output pulse. This causes fantastic electrical noise—the phone rings, for instance. We will get these fields as low as possible in the instrumented target areas by using an R. F. screen room. When it's ready, the facility will be available to all Sandia Corporation groups working in radiation effects."

Ken also plans to add seven more strip lines to the generating unit inside the tank. These should bring the output of the device up to about 50 rads and will necessitate increasing the condenser bank capacity to 35 kilojoules.

Safety is designed into the facility. The x-ray tube fires into the copper screen room which is positioned against a concrete wall. The x-rays are confined to the screen room or absorbed by the wall. The screen room doors are fitted with an interlock sys-

tem which prevents the machine from firing if the doors are open. All personnel wear film badges which are routinely processed every two weeks.

"Our success so far indicates that we are on the right track," Ken says. "We had hoped for an output of 12 rads from the machine, but we achieved 20 rads. With the additional strip lines and more power, 50 rads output is feasible."

The new facility will augment Sandia's present 600 kilovolt flash x-ray which has been averaging 1000 tests monthly. Also under development is a two-megavolt flash x-ray machine. When completed the two-megavolt machine and the others will form an integrated test facility which will provide an extreme range of possible x-ray dose for experiments in radiation effects.

SNT Chapter to Give UNM Course in Ultrasonic Testing

The local chapter of the Society for Nondestructive Testing plans to provide guest lecturers for a non-credit course, "Introduction to Ultrasonic Testing," to be offered by the University of New Mexico Community College.

Classes of the 12-week course will be held every Wednesday from 7-9 p.m. Registration for the coming semester will be Feb. 1 and 2 at the UNM Administration Bldg.

Further information about the course may be obtained from Don R. Fisher or Robert A. Baker, both of Area I Laboratory, tel. 264-1408. They are education co-chairmen for the SNT chapter.

Editorial Comment About Life Insurance

Employees entertaining doubts about the need for or value of their Sandia group life insurance might be interested in a look at the 1964 statistics on employee deaths.

The beneficiaries of 23 employees on roll and five retired employees who died last year received \$512,838.67 in benefits from Sandia-sponsored life insurance. Two-fifths of this amount was from the Basic Group Life Insurance Plan wholly paid for by the company. The remainder was from the Supplemental Group Life Insurance Plan which includes double indemnity for accidental death. This insurance premium is paid for by both the employee and Sandia Corporation.

Looking at it differently, it may be pointed out that the beneficiaries of the on-roll employees who died received an average of \$18,315. These employees had been paying an average of \$42.16 annually in premiums. Retired employees pay no premium.

There is a natural feeling in the normal healthy human being that "it can't happen to me." But here is a sobering thought—five of these 28 deaths were accidental; not due to age, disease, or "natural causes." These five occurred as results of automobile accidents.

Careless Food Storage Results in Much Sickness That Could be Avoided

by S. P. Bliss, M.D.
Sandia Corporation Medical Director

Many of us would not consider eating in a dirty restaurant but we still violate basic rules of sanitation in the preparation, serving, and storage of foods. Food-destroying bacteria are ever-present in nature and only need an opportunity to infect foods. These bacteria and their toxins produce effects in humans ranging from minor gastric upset to fatalities.

Most bacterial contamination of food is caused by improper cooking, human contact, insects, and improper storage. During the holiday season, a great variety of perishable foods was prepared for parties, buffets, and smorgasbords. You can imagine the number of contacts a tray of food had when hundreds of persons filed past. These foods provided excellent culture media at room temperature and only a short period of time was required for growth.

Ideally, perishable food should be pre-

pared and consumed within 24 hours. Food containers should be closed and refrigerated while not being served. Foods should be served in a manner to exclude human contact whenever possible. The consumption of perishable food at the work place is not recommended since the above factors cannot be controlled. Any perishable food brought to work for a special occasion should be kept covered and kept cool, preferably below 50°F. If all such foods are not consumed the remainder should be refrigerated immediately. If this is not possible then these foods should be discarded.

Considerable effort is expended in providing safe food and clean facilities at the Area I Cafeteria and Coronado Club. These facilities should be used whenever food is to be served and consumed. This will allow the Medical Department to exercise control over the factors that produce food poisoning.

Franklin Barnett Retiring from Sandia This Month



Franklin Barnett will retire the end of January after 13 and a half years at Sandia, the majority of the time in Technical Manuals Department.

Several years ago he and his wife purchased acreage in Prescott, Ariz. Mr. Barnett designed a house for the site and construction has just been completed. Their street address is 2403 Country Park Drive.

Since both of the Barnetts have been avid amateur archaeologists for many years, their new home contains a museum room where they can display their collection of more than 500 ancient pottery vessels and about 600 modern (since 1700 A.D.) pieces of pottery and baskets made by the Indians of the Southwest.

The couple has done considerable excavation on private lands in both Arizona and New Mexico, including 93 rooms in one ruin. Mr. Barnett plans to write a report on that dig since they kept complete records of their findings, and have photographs and drawings.

In addition to his avocation of archaeology, Mr. Barnett will write historical novels. One, entitled "The Wound is Green," was published about six years ago.

Service Awards



Jerome F. Durrie
1543
Jan. 16, 1950

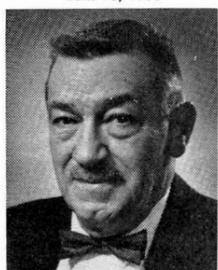
15 Years



P. R. Candelaria
2523
Jan. 16, 1950



Kenneth F. Crowder
7436
Jan. 20, 1950



George R. Cooper
9423
Jan. 23, 1950



Francis Patterson
2113
Jan. 28, 1950

10 Years

Albert A. Schnedler 7532, Charles J. Puglisi 3428, Wil-
lard R. Randall 4622, Harold A. Becker 8165, George W.
Cosden 4371, Robert A. Erickson 1333.
Billy M. Ray 7252, A. L. Scharping 3126, Mary G. Geil-
enfeldt 4131, Bertha M. Oliver 2231, Louis P. Baudoin
2211, and Donald R. Morrison 5256.

T. W. Hoover – Sandia Engineer – Takes Representative Post in Legislature

When the State Legislature convenes in Santa Fe Jan. 19, a Sandia Laboratory engineer will be among the 77 Representatives taking seats on the floor of the House.

Thomas W. Hoover of Advanced Systems Development Department II was elected from Albuquerque's District 17 during the November General Election. His opposition (on the Democratic ticket) was Imogene Lindsay whose husband, Bert, also works at Sandia.

"I had two opponents in the primary election and am glad I did. It made me get out and meet the people in my district and indirectly made campaigning for the general election easier for me," Tom said.

Tom had been interested in political affairs for a number of years and has been active in the Republican party the past several years, but this was his first attempt to run for public office.

"I used to sit and complain," he said, "but finally I became convinced that the best idea was to do something. I felt I had a public service to perform—if the voters wanted me."

In mid-December Tom attended the pre-session in Santa Fe which includes an orientation for freshmen and an opportunity for the parties to organize with regard to election of their leadership. At that time the legislators submitted their committee preferences, with the decision on appointments to be made by Speaker Bruce King. Each of the legislators in the House (except for the speaker and the majority leader) serves on two standing committees. Tom expects to be notified of his committee appointments in the near future.

"I'll probably co-sponsor some bills, but I don't feel the act of submitting bills is



T. W. Hoover

as important for a freshman legislator as studying the bills of others and voting accordingly," he said.

The legislative session normally lasts 60 calendar days. Tom has carried over the maximum days of vacation and will take time-off-without-pay for the balance of the period. His wife and year-old son will remain in Albuquerque. "I'll stay in Santa Fe during the week as I'll need time to study bills, but I'll be back in Albuquerque weekends," Tom added.

A mechanical engineer, Tom has been with Sandia Corporation 10 and a half years, first assigned to a weapon project group, and for the past five years in the Advanced Systems Development organization.

Sandia Speakers

Rosa M. Bodenhamer of Administrative Programs Division, "Automation and Our Changing Society," Systems and Procedures Association, Dec. 8, Albuquerque.

G. W. McClure of Atomic Interactions Research Division, "Differential Angular Distribution of H and H+ Dissociation Fragments of Fast H₂+ Ions Incident on H₂ Gas," Georgia Institute of Technology colloquium, Dec. 8, Atlanta, Ga.

Melvin D. Fimple of Applications Oriented Systems Division, "Methods and Programs for Nonlinear Regressions," Los Angeles chapter, Statistical Program Evaluation Committee, Jan. 12, Los Angeles.

Take Note . . .

Apparent low bidder at \$12,863 for a modification project to Bldg. 9920 in Coyote Test Field is the Jack B. Henderson Construction Co. of Albuquerque, according to an announcement by the Atomic Energy Commission.

Used by Explosive Facility Division of Applied Physics Research Department, Bldg. 9920 will have its air conditioning equipment relocated outside the building to make room for additional instrumentation used in the study of solids under high pressure shocks. Other electrical modifications are included in the construction project.

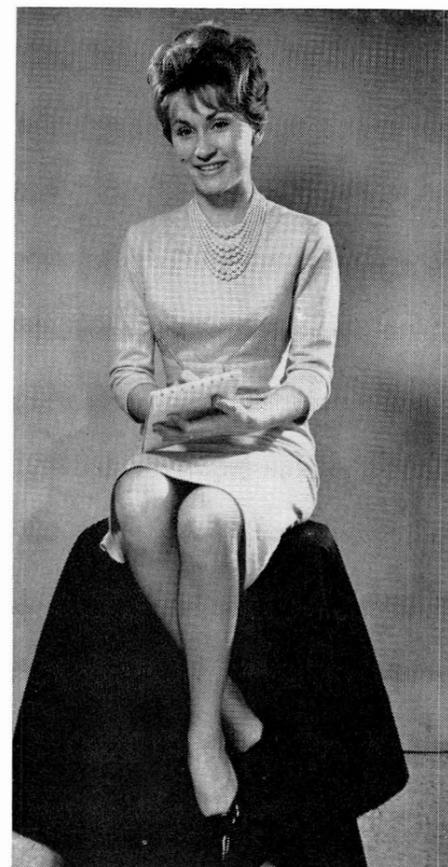
Robert F. Armstrong is the Plant Engineering Department project engineer. Work is to be completed within 90 days after the contractor is notified to proceed by the AEC.

* * *

The Coronado Ski Club will meet Monday, Jan. 18, at 7:30 p.m. in La Cana Room of the Coronado Club. Members will plan details of a Club outing to the Red River ski area in February, according to program chairman Glen Whiting. In addition, Warren Miller's "Design for Skiing" will be shown and refreshments will be served.

* * *

Two local square dance clubs will offer lessons for beginners starting Jan. 20. The Road Runners Club will feature Frank Cerkleski as instructor and caller. Additional information may be obtained from Robert Burton of NTS Test Support Division, home tel. 299-9000 or 255-9247. Ken Hostetler of Electrical Standards Division has additional information about the Square Ups Club lessons at Christ Methodist Church from 8-10 p.m. He can be reached evenings at 256-3803.



Bobby Johnson (1333)

Take a Memo, Please

Time taken out for safety is time well spent.

SANDIA CORPORATION LAB NEWS



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J. J. Thomson and the Beginnings of Modern Physics

This article was written for the LAB NEWS by C. C. Hudson of Theory & Analysis Division in Nuclear Burst Physics Department.

The last chapter of the Lab News Science Series described the discovery of x-rays by Wilhelm Roentgen in 1895. This event initiated one of the most exciting decades of discovery in the history of science. Before it was over, many of the fundamental ideas underlying modern physics had been formulated: radioactivity (Becquerel 1896, and others); the electrified particle character of matter (J. J. Thomson 1897); the quantized character of energy (M. Planck 1901); and the relativity of motion (A. Einstein and others 1903). We shall set aside radioactivity and relativity for the time and pursue those events that lend directly to the formulation of Quantum Mechanics.

Shortly after Roentgen's discovery of x-rays, J. J. Thomson (1856-1940), working in the Cavendish Laboratory at Cambridge, showed that x-rays caused an increase in the electrical conductivity of a gas. He referred to this as "a kind of electrolysis," and reasoning along the lines of the then current chemical theory of ionic conduction in liquids, he speculated that the molecules of the gas were split in two, or "ionized." Without appreciating it, he had described the fourth state of matter, the plasma.

The notions of discrete atoms and of their combination to form molecules was well-established by this time; but physical models of the individual particles were vague, and no one thought seriously of splitting the atom into smaller particles. In 1867 Lord Kelvin had suggested that atoms had some of the properties of vortex motions (like smoke rings) and the idea of vortex atoms had persisted. J. J. Thomson had, in 1883, attempted to describe a molecule as a combination of two vortex atoms, and had developed a mathematical theory to describe an electric discharge in a gas in terms of the breakdown of vortex molecules. This idea seems unwieldy to us today, but in the absence of experimental evidence, it had a mathematical appeal. It was not wholly abandoned until 1905, and then not because experiments to the contrary, but because Lord Kelvin was unable to show that a vortex atom was stable!

During the early 1890's, experiments were being made in many laboratories using modifications of the Crooke's discharge tube. When a glass tube containing two electrodes is pumped down to about a ten-thousandth of atmospheric pressure and a sufficient potential applied to the electrodes, the gas is seen to glow. For sufficiently high potentials, x-rays are produced near the positive electrode (anode), as was shown by Roentgen. When a hole was cut in the anode, a beam emerged which sometimes caused the air to glow and produced a bright spot of fluorescence on the glass wall. The beam was called a beam of cathode rays and the nature of these rays was the subject of considerable speculation. It was thought by some (particularly in Germany) to be some kind of disturbance in the "aether," and therefore electromagnetic in origin.

In 1894, J. J. Thomson measured the speed of the emanation to be about 10^7 cm/sec. Although his measurement was later shown to be too low, it served to suggest that the emanation was not electromagnetic, which would have to travel at 3×10^{10} cm/sec. This new insight was to lead to the breakthrough which established the particulate nature of matter.

Based on Maxwell's famous researches in electromagnetic waves, a theoretical



description of wave propagation through an "aether" was developed. The properties of the aether were not well known and sometimes special properties were invented to explain a new phenomenon. So it was that the German school favored the aether explanation of the cathode ray. The English school, on the other hand, favored the interpretation that the rays were streams of particles carrying negative electricity. Thus the stage was set for a dramatic showdown.

This is the exciting part of science, where the differences of conflicting theories are resolved by recourse to experiment. That such an impartial referee exists is fundamental to the "scientific method."

In a long series of careful laboratory measurements, Thomson was able to show that cathode rays: (1) were charged particles, not wave motions; (2) that their charge was negative and always of the same amount; (3) that they were deflected both by electric and magnetic fields in accordance with theory; and (4) that they always had the same mass regardless of the material from which they were derived, a mass which was more than a thousand times less than that of the hydrogen atom. The new particles were called "electrons," but the origin of the word is somewhat in doubt. Most of the results, and the precise measurements which helped to establish them, were published in a classic paper in 1897. In 1903, Thomson made a more complete exposition of the electron and its relationship to the ionized gas in a book "Electrical Conductivity in Gases" which remains good reading to this day.

The theory of aether suffered a severe blow. It was removed from the arena of atomic physics, but it remained for Einstein to demolish it altogether with his theory of relativity.

In his experiments with gases, Thomson invented three devices which were to become of great importance to the scientific community—and to many others as well. His measurement of the speed of electrons was done with a rotating mirror camera, an instrument which is now commonplace in our laboratories to measure phenomena in microseconds. In proving that the cathode rays could be deflected by electric and magnetic fields, Thomson invented the cathode ray tube, today used in oscilloscopes and television receivers. And when he turned his attention to the other component of the electrical discharge—the heavy ions that moved toward the cathode—Thomson invented a device

which was later to be developed into the mass spectrograph. With this instrument, he was able to analyze the mass spectrum in a crude way.

J. J. Thomson's researches were of the greatest importance, covering roughly the period 1880 to 1910. During this time, in addition to the achievements in laboratory instrumentation noted above, Thomson discovered the electron, thereby establishing the electrified particle character of matter. He also showed on theoretical grounds that electromagnetic waves carry momentum, and he invented a new model of the atom based on electric charges. He received the Nobel prize in 1906 for his researches on conductivity in gases. He was Cavendish professor of experimental physics from 1884 until 1918, and from then until his death in 1940 he was Master of Trinity College. He enjoyed so great a reputation as a teacher that nearly all the important chairs of physics in the British Empire were filled by his students."

So much for Thomson the mature scientist. What had he been like in his early formative years and as a man?

Thomson was born into a middle class family involved largely in small business endeavors. His father ran a bookstore; his brother joined a rather large textile company. He had a sister and also a brother. Thomson was a vivacious, irrepressible person who loved children and when playing with them was almost a child himself. But he had a strong tendency toward absent-mindedness and was prone to lose himself in thought. Apparently his family indulged his moods to a large degree.

He had no contact with science through his family, although relatives recalled his wanting to go in for "original research" when in his early teens. Thomson's father started him in 1871 at Owens College in Manchester when he was 14. He studied principally mathematics and physics with a dedicated science teacher in a suite of attic rooms with only a half dozen other students. He won four scholarships and prizes in the next two years. He spent five years at Owens, entering Trinity College at Cambridge University in 1876. He published his first paper in the Proceedings of the Royal Society while still at Owens.

At Trinity, he passed the Mathematics Tripos exam second only to Joseph Larmor, but he had difficulty with exams, and was not "a good examination candidate." Thomson did not engage in rowing, cricket, or other sports, but he enjoyed walking and lawn tennis. He liked to read paperback novels and had a large collection of music hall songs.

J. J. Thomson was appointed Cavendish Professor of Experimental Physics while only 28 years old, at that time an unprecedented appointment. He won out over a number of other competitors, and it is a little startling to read in their exchange of letters frank discussions of the rivalries. But this openness was to be characteristic of him and he was "in general impatient of obscurity" both in his work and in his dealings with men.

Thomson met his future wife Rose Paget while she was a student in one of his classes. They were married in 1890 after a short engagement. The marriage appears to have been one of great tranquility in which Mrs. Thomson was allowed complete freedom to manage the household, J. J. (as he was called by everyone), being preoccupied first in his laboratory and then with administrative duties, in perfectly traditional professorial fashion. In fact, his concern with the purely academic life typified his later years, and he lost all interest in the creative activities that had characterized his early life.

J. J. Thomson was a short, energetic, near-sighted man with a friendly attitude



A TRANSDUCER is being used by James P. Quint, Northwestern co-op student, to check out operation of an underwater recovery unit in a test water tank.

Northwestern U Co-op Student Working at Sandia Laboratory

Sandia Laboratory has long had temporary employees during the summer months, but James P. Quint is the first Northwestern University co-operative student we've had on roll. He is in his fourth period of employment at Sandia.

A graduate of Highland High School in Albuquerque, Jim had a scholarship the first two years, however Northwestern's well-established co-op program was a determining factor in his attending that particular school.

The program takes five years for completion and has involved alternating quarter periods of study with a similar period of time working in industry. "The program will change this summer and extend over six months instead of the shorter period," Jim explained. He is an electrical engineering student and estimates that about 90 per cent of the EE students at Northwestern are in the university's co-op program.

His first two periods at Sandia were under W. T. Smith in Test Projects Department where he did transducer calibration and acceptance tests on new amplifiers. Last summer and again this winter he has been assigned to W. V. Hereford in the same department. His work here is in underwater trajectories and underwater noise analysis. Last summer Jim wrote a Cooperative Education Job Report which has since been printed as Sandia Technical Memorandum 64-1664. The paper discusses the use of mechanical noisemakers to aid in obtaining underwater trajectory data during the initial phases of a high-speed drop into water.

"I feel the co-op program is worthwhile for the student because the engineering schools teach mainly theory. Work in industry fills in the gaps with more practical knowledge. The hardest part about the program is getting back to the books after a couple of months of working and living at home," Jim added.

Just as with Sandia's summer program (which attracts both college students and teachers), participation of the Company in such a co-operative program allows both the student and the Company an opportunity to measure in depth an ultimate mutual interest in permanent employment, as well as providing technical assistance to the laboratory during the time the student is here.

and a driving eagerness for work. Aston wrote of him: "When results were coming out well his boundless, indeed childlike, enthusiasm was contagious and occasionally embarrassing. Negatives just developed had actually to be hidden away for fear he would handle them while still wet. Yet when hitches occurred . . . (his) intuitive ability to comprehend the inner working of intricate apparatus without the trouble of handling it appeared to me then, and still appears to me now, as something verging on the miraculous, the hallmark of a great genius."

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LAB NEWS

JANUARY 15, 1965



THE SECRETARY to Presidents, present and past, Rosalie Crawford combines Western friendliness with office propriety in answering the telephone or greeting visitors.

Rosalie Crawford Has Called Five Sandia Corporation Presidents 'Boss'

Through recent years, a familiar voice on the telephone has said, "This is Rosalie in Mr. Schwartz's office." But the same person has also been secretary to Sandia's former presidents.

To many, Rosalie Crawford typifies the friendliness of Westerners—both in person and over the telephone. This way with people, combined with efficiency and the customary secretarial skills, makes Rosalie a valued executive secretary.

Rosalie was hired at Sandia in November 1948 as a grade 3, pay, \$187 a month. Her previous experience included working summers for a mining company in Deming, N. Mex., while attending college and, after graduation, two and a half years employment in a Vallejo, Calif., law office. "Fred Schneider, now a buyer in Purchasing, was my Personnel interviewer," she said. "I remember, he asked if I was afraid to use a dictionary. I replied that I couldn't operate without one."

Her first boss was J. C. Starks, assistant manager of the SLE Engineering Department. At that time Los Alamos' Sandia Branch had about 1000 employees, and Rosalie knew most of them within a short period. "Our office was in Bldg. 818, a 'temporary' wooden barracks building. When the wind blew, the dust drifted in." Rosalie frequently asked Bill Boyes (now assigned to Bellcomm, Inc.) to read proof on her typing. "He laughed and laughed one day," she recalled. "Mr. Bice had given me some dictation and referred frequently to 'baroswitches.' I thought he was talking about 'barrel switches'."

Works for First President

After a few months she became secretary to L. A. Hopkins (now 1300), who was assistant to R. W. Henderson, the Technical Associate Director. On Oct. 29, 1949, at 10 a.m. Paul J. Larsen, Director of Sandia Laboratory (under Los Alamos), asked Rosalie if she would be secretary to the new president. "I was reluctant," she said. "I had been married only a short time and didn't expect to work very long." At 1 p.m. she reported to her new boss, George A. Landry of Western Electric, who on Nov. 1 became president of the brand new Sandia Corporation.

"Building 800 felt like a palace in comparison to Bldg. 818, but it was lonely as I was in an office by myself. At that time about 90 per cent of all classified mail was addressed to the President and I frequently had to sign for 150 classified documents at one time. Worst of all, Mr. Landry would ask for Fred S..... and I never could tell if he wanted Fred Schmidt (Vice President and Operation Manager) or Fred B. Smith (Treasurer). I'd invariably guess wrong," she said. Rosalie never did find out exactly why he picked her for his secretary. "That's my secret," he would say.

Her dictation and typing received a real workout from Sandia's second president, Donald A. Quarles (March 1952—September 1953). He dictated four hours a day and Rosalie could be found transcribing her notes both before and after normal working hours. "But no matter if I came in at 6:30 a.m. or left at 7 p.m., Mr. Quarles would be in his office," she said. "Mr. Quarles had a fabulous memory. I remember his dictating a 10-20 page paper. After he finished, he referred back to 'about paragraph 10,' repeated verbatim a particular sentence, and made an insertion. He was the kind of person who was so appreciative that no one minded working long hours. But all of the men have been fine in their own way. I've just been lucky."

Both Mr. Quarles and his successor James W. McRae, who served as Sandia Corporation's president from September 1953 to October 1958, were frequent travelers. Mr. McRae enjoyed giving speeches, but these were ad libbed, he didn't even use notes.

It was also about this time that Rosalie and Virginia Potter began to have adjoining offices. They are now in the same room and "cover" for each other. Until recently there had never been a time when both Rosalie and Virginia were on vacation or ill at the same time, therefore, no one else has had to be given the combination to the safes in the President's office. They alternate taking a late lunch hour so one will be on hand to answer the telephone and guard classified material.

"This arrangement has helped us prevent security violations and the men have been exceptionally good about monitoring when they return to the office after we have left," Rosalie noted. "We have had violations in the past, but not for several years."

Messrs. Landry, Quarles, and McRae are deceased, but Rosalie continues to correspond with their widows.

Work Now Less Hectic

Under J. P. Molnar, president from October 1958 to September 1960, and his successor S. P. Schwartz, the work has become less hectic. Rosalie assists with travel arrangements and reconfirms reservations; she arranges conferences held in the meeting room off the President's office; and she answers Mr. Schwartz's telephone when he is out of the office. ("Sometimes when the president answers directly, people get so flustered that they hang up," she said.) And there are numerous visitors. "September, October, April, and May are the most popular months," she noted, "probably because most of the DASA briefings for military men from Washington are held then. Occasionally state or federal officials will call and also men from the Bell System.

H. Jack Blackwell Heads New AEC Area Office in Amarillo, Tex.

The Atomic Energy Commission has announced that effective Jan. 1, its Amarillo (Tex.) Branch Office was upgraded to an Area Office with H. Jack Blackwell of San Antonio, Tex., as Manager. Mr. Blackwell has been Manager of the Commission's San Antonio Area Office since Nov. 12, 1958.

The announcement was made in Albuquerque by L. P. Gise, Manager of the Commission's Albuquerque Operations complex which has as its primary mission

the development and manufacture of nuclear weapons.

Mr. Gise explained that the redesignation of the Amarillo Office stemmed from the decision announced Apr. 3, 1964, to close ALO weapon facilities at San Antonio and at Clarksville, Tenn., by July 1966 and to transfer their operations to the Burlington (Iowa) and the Pantex (Amarillo) plants. All four facilities are part of Albuquerque Operations.

Also as of Jan. 1, the San Antonio office was redesignated as a Branch Office, as is the Clarksville Operation. Both are under the new Amarillo Area Office. As a Branch Office, Amarillo has been under the Commission's Area Office in Burlington but after Jan. 1 it was directly under the Manager of Albuquerque Operations.

Mr. Blackwell will devote much of his time in the next year and a half to the transfer of operations from San Antonio and Clarksville to Burlington and Amarillo. In the immediate future he will divide his time between Amarillo and San Antonio. George Cook, who has been Branch Manager at Amarillo since Feb. 17, 1958, will continue to handle many details of the Pantex operations, serving as a Special Assistant to Mr. Blackwell.

Albert O. Mueller, who has been Chief, Operations Branch, in the San Antonio office since June 10, 1962, became Acting Manager at San Antonio on Jan. 1. Ralph M. Kopansky will continue as the AEC Manager at the Clarksville Branch Office.

The Amarillo office is one of 11 field offices in eight states that make up the Albuquerque Operations organization, with Headquarters in Albuquerque. It was activated as a Branch Office when the AEC established operations at the Pantex Plant in October 1951, and administers a contract with Mason & Hanger-Silas Mason Co., Inc., for operation of the facility. The plant now fabricates chemical explosives and has functions in component and nuclear weapon assembly.

Mason & Hanger-Silas Mason Co., Inc., also operates the Commission's facilities at Burlington, San Antonio, and Clarksville.

Home Fire Has One Blessing — It Gives Subject for Article

Current issue of **Family Safety** features an article by G. C. McDonald of Advanced Systems Research organization. His story, "Danger: Cooking Oil" is one of the four runners-up for the magazine's annual family safety story of the year contest.

The article describes an incident with deep fat frying that resulted in a fire in the home. The dangers of grease fires are described and some safety precautions are listed.

The magazine welcomes entries in the contest. The articles must show how safety precautions paid off for you or how you learned the value of safety through some experience. Address letters to "Family Safety Story of the Year," **Family Safety Magazine**, National Safety Council, 425 North Michigan Avenue, Chicago, Ill., 60611.

Sandia Film Chosen By AEC for Use In Field Libraries

A Sandia-made film has been selected by the Atomic Energy Commission for inclusion in the AEC motion picture library and for distribution (free of charge) from nine AEC field libraries.

The movie is "Vela Program: Satellite Detection System," a full-color, 16mm, 17½-minute feature filmed by Industrial Photographics Division for the Advanced Research Projects Agency of the Department of Defense and the AEC.

Designed primarily for professional audiences, the film explains the nature of the atmosphere surrounding our planet and the problems involved in detection of nuclear explosions outside the earth's atmosphere.

The film may be borrowed by contacting Sandia's Public Information Division, tel. 264-4207.

The Board of Directors comes to Sandia at least once a year. If the men are here frequently I remember them, but I still have a hard time telling a General from a Colonel."

The visitors who particularly stand out in Rosalie's memory include: K. E. Fields and A. D. Starbird of the AEC Division of Military Applications; Ernest O. Lawrence, inventor of the cyclotron, and University of California director, for whom Lawrence Radiation Laboratory was named; George B. Kistiakowsky of Harvard University, director of LASL's Explosives Division in 1945; Edward Teller, "father of the H-bomb"; John von Neumann, Princeton mathematician and atomic scientist who designed the MAN-IAC computer; Gen. Bernard A. Schriever, Commander, Air Force Systems Command; and Adm. W. S. Parsons, who armed the "Little Boy" in a rear cabin of the **Enola Gay** while the plane was en route to Hiroshima.

Rosalie considers the ability to make people feel at ease and welcome one of the most important attributes of an Executive Secretary.

Now and then Sandia's other top secretaries give Rosalie a cross-section of their feelings on any proposed change, but one time Rosalie spearheaded a drive herself when there was an attempt to do away with Classified Document Logs. "I felt strongly about that. I'm often used as a reference and the log book is the only record I have of mail coming through the office," she said.

"A reference" is a modest way to describe the first-hand knowledge of decisions of five presidents available from one person.

Deaths . . .



A Sandia employee at Tonopah Test Range, Joseph P. Lazarr, died in a head-on automobile crash on New Year's eve. The accident occurred on U.S. Highway 95 about 22 miles south of Fallon, Nev.

Mr. Lazarr, who was 56, had worked for Sandia Corporation 14 years and had been assigned to Tonopah Range Operations Division since 1958.

Survivors include his widow, who resides at the family home in Al Tahoe, Calif., and three children: Mrs. Donna Williams of Al Tahoe, Mrs. Sandra Beadersted of Amarillo, Tex., and Thomas Lazarr of Fairfield, Calif.



Ilva R. Baldwin, supervisor of Typing Services Section, died Jan. 1 after a brief illness. Originally she was scheduled to retire on Dec. 31, but was placed on deferred retirement after being taken ill on Dec. 29.

Mrs. Baldwin had been at Sandia more than 16 years and had been in charge of the typing pool for 11 years.

Survivors include her husband, Homer, a retired Sandia employee; two married daughters, one living in Taos, N. Mex., and the other in Rapid City, S. D.; nine grandchildren; and her mother, who lives in Winslow, Ariz.



MRS. CAROL MARTIN is the first winner in the 3000 organization's monthly safety slogan contest. She receives a certificate and traveling trophy from H. W. Maglidt (second from left), chairman of the 3000 safety committee. At left is Noble Johnson, committee member. Participating in the ceremony at right are R. B. Powell, 3000 Vice President, and Jim Martin. Mrs. Martin's winning slogan was "Part Time Safety is Full Time Folly."

Safety Campaign in 3000 Org. Gets Significant Results in A Hurry

One possible tragedy averted and more than 1000 employees and their families talking and thinking about safety—this is the current accomplishment of the "Safety Crusade" of the 3000 Organization.

"There's more to come," promises H. W. Maglidt, manager of Graphic Arts Department and chairman of the Crusade. "Objective of this campaign is to instill an active safety awareness both on the job and at home. We will conduct a monthly slogan contest, see more safety movies, discuss hazards and attitudes, and each employee will be visited regularly by a supervisor to discuss safety."

"We are asking for ideas, suggestions, and help. The only way to achieve our objective is for everyone to be involved with safety."

As a result of one of the kickoff sessions, held in November, an employee reported that the fire safety film shown at the meeting possibly saved her home. After seeing the film, she checked her furnace at home and found a large piece of paper blocking a vent. This could have eventually caused a fire, she reported.

At the kickoff sessions, R. B. Powell, 3000 Vice President, emphasized the need for safety everywhere, all the time. "Accidents cause suffering and grief whether they happen at work, at home, or on the highway," he said. He urged all employees to fully participate in the safety crusade.

Last week, Mr. Powell awarded a certificate and a traveling trophy to the first winner of the monthly safety slogan contest.

Mrs. Carol Martin (wife of Jim Martin of Job Evaluation Division) submitted the

winning entry—"Part time Safety is Full Time Folly." All 3000 employees and their families are eligible to enter the contest. The slogan will be displayed and promoted for a month until the next winner is announced.

Members of the Crusade committee include Mr. Maglidt, B. H. Finley, J. N. Johnson, M. A. McCutchan, J. W. Galbreath, V. O. Henning, J. E. Davidson, C. A. Ashby, W. R. Rosenburg, F. S. McDonald, M. N. Orrell, G. A. Uszuko.

H. S. Schwarz, R. J. Everett, H. L. Rarrick, Bernice Sanders, S. T. Mancuso, T. B. Heaphy, N. V. Tarnawsky, J. G. Marsh, F. A. Baczek, W. K. Cox, N. E. Hansen, C. A. Herrmann, P. C. House, and T. E. Zudick.

Welcome Newcomers

Dec. 25 - Jan. 8

Albuquerque	
Robert L. Davis	2136
Mildred S. Hill	3421
U. Victoriana Jaramillo	3413
Ella R. Largent	3126
Marie S. Luna	4372
William C. Mauer	4543
*James P. Quint	7215
Geneva Wiseman	4432
California	
Richard J. Vent, Richmond	5251
Colorado	
John Kelly, Boulder	5242
Connecticut	
Richard E. Nettleton, New Haven	5155
Maryland	
Edwin Sherry, Woodstock	5253
Ohio	
Fred A. Fischer, Mansfield	1333
Oregon	
Donald R. Parker, Portland	3311

*Denotes rehired

Sandia's O. J. Foster Elected Head 1965 Inter-Base Sports Council

Heading the Inter-Base Sports Council for 1965 will be O. J. Foster of Benefits and Services Division. The Council arranges competition in six major sports among Sandia Laboratory, Sandia Base, Kirtland Air Force Base, and Manzano Base.

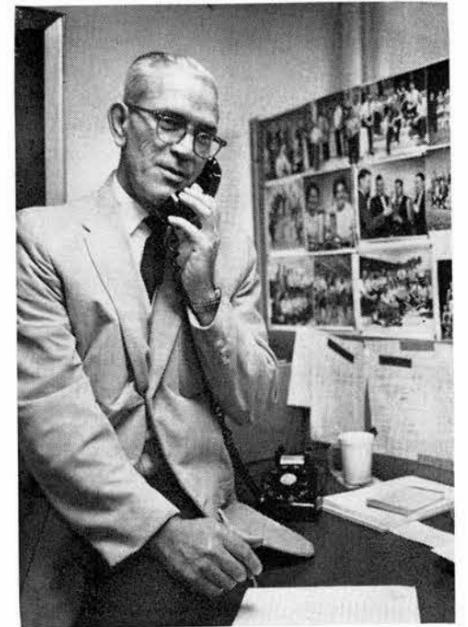
For the Inter-Base tournaments, the four participating agencies field teams of top athletes, star players distinguished in intramural programs within their organizations.

As chairman of the Council, "O.J." will be performing long-familiar duties. He has headed Sandia Laboratory recreation programs for the past three years, organizing out-of-hours recreation for more than 4000 sports-minded Sandians.

"The Inter-Base Council was organized in 1960," O.J. says, "primarily to provide tough competition for military teams practicing for Army, Air Force, or Navy regional playoffs. Sandia Laboratory was invited to participate because we are located on Sandia Base and we have a long history of cooperation with the military in the use of facilities and equipment."

Through the years, a friendly rivalry has developed. The teams look forward to the Inter-Base tournaments and covet the traveling trophies. Good spectator interest has also been generated.

"We civilians feel pretty good," O.J. says, "when we have defeated a military team that goes on to a Fourth Army champion-



O. J. Foster

—Chairman of the Inter-Base Sports Council—

ship. We've lost our share, too, but we play for the fun of it."

The schedule for the 1965 Inter-Base tournaments is as follows:

- Feb. 8-12—Basketball, tournament hosted by Sandia Laboratory
- Mar. 27—Bowling, Manzano Base host
- Apr. 19-23 — Volleyball, Manzano Base host
- July 24-25 — Golf, Sandia Laboratory host
- Aug. 9-13—Softball, KAFB host
- Nov. 8-12—Flag Football, Sandia Base host

AIE Members to Tour Clean Room In Gulton Plant

Members of the New Mexico Area Chapter of the American Institute of Industrial Engineers will tour the new clean room facilities of Gulton Industries, Inc., on Tuesday, Jan. 19. Chapter members Anthony Panagakos, general manager, CG Electronics Division of Gulton Industries, Inc., and Larry Neely, production manager of the firm, will conduct the tour.

The Gulton clean room, one of the largest, most efficient, and most economically built in the nation, utilizes the laminar flow principle of contamination control invented by Willis Whitfield of Advanced Manufacturing Development Division.

The tour will begin at the Gulton Plant, 15000 Central Ave. SE., at 7 p.m. Other interested persons are invited to attend the tour. For information, contact Joel Martin of Operations Planning and Quality Control Division, tel. 264-3409.

Death . . .

Details were received this month of the death of Ezra Horner, a retired employee, in Mountainview, Mo., Oct. 9. He was 76.

Mr. Horner was a material handler while at Sandia Laboratory, and retired May 29, 1953. He is survived by his son, Charles, of Birchtree, Mo.

PAGE FIVE

LAB NEWS

JANUARY 15, 1965

SHOPPING CENTER

CLASSIFIED ADVERTISING
Deadline: Friday noon prior to week of publication unless changed by holiday.
A maximum of 125 ads will be accepted for each issue.

- RULES**
1. Limit: 20 words
 2. One ad per issue per person
 3. Must be submitted in writing
 4. Use home telephone numbers
 5. For Sandia Corporation and AEC employees only
 6. No commercial ads, please
 7. Include name and organization
 8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

FOR SALE

- OUTBOARD MOTOR, 1961 Merc. 200 w/remote controls, \$220. Lathrop, 298-8638 after 5:30.
- BEST PINON FIREPLACE LOGS, all split, \$15 pickup load, stacked, free delivery. Miller, 282-3617.
- '56 WILLYS S/W 4wd, winch, warn hubs, new Chev. V263 engine, battery, accessories, 6 plies, \$850 or best offer. Illing, 299-7378.
- 2 SETS box springs and mattresses, twin size, \$10 per set. Uhl, 501 Charleston NE, 268-1855.
- PALOMINO COLT, female, 20 mos. old, \$175 or best offer. Netz, 282-3607.
- WESTINGHOUSE electric clothes dryer, '59 model, \$75, eight cycles, regular, silks, synthetics, wash and wear, etc. McKelvey, 256-9787.
- '59 FORD 4-dr., \$600, will trade. Morgan, 256-7994.
- BESSLER 45M 16mm to 4x5 enlarger, condenser and cold light heads, 2" and 5/4" lenses, 3 negative carriers, Saunders easel, Time-O-Lite timer, \$300. Goodwin, 256-2216.
- POLAROID Model 95 camera w/automatic shutter, w/flash, copier, case, \$80. Hodges, 268-5097.
- STEREO AMPLIFIER, Concord AM-FM, Girard changer, 2 speaker enclosures w/Stromberg-Carlson 12" woofers and tweeters, cross-over network. Hodges, 268-5097.
- '58 CHEV 4-dr. sedan, 6 cyl., ST, new tires, recent overhaul w/warranty, \$450. Roth, 255-9617.
- 3-BDR. 1 1/2 bath, utility room, perimeter heating and air conditioning, \$12,500, 5304 Arvilla NE. Montoya, 344-8416.
- TWO MODERN CHAIRS, \$10, \$15. Corli, 255-5683.

- 17" PHILCO TV console, walnut cabinet, \$35. Coleman, 299-2377.
- '60 PORSCHE 1600 super coupe, \$2150; Queen size bed, National-Supreme, \$120. Wolski, 255-6441.
- 26" BOY'S BICYCLE, black w/chrome fenders, price new \$38, sell for \$15, less than 2 yrs. old. Cowham, 298-4249 after 5:30.
- '61 VW TRANSPORTER, low mileage; Motorcycle Triumph Tiger Cub, Waldorf, 344-1017.
- BRICK FLOORS, beam ceilings in den, DR, large corner fireplace, 2 bdrs, lots of flowers, for appraisal. Church, 256-3960.
- 120 BASS ACCORDIAN, \$150. Romine, 298-4261 after 5:30.
- TRUNDLE BUNK BEDS w/mattresses, one foam rubber, \$35. Kochmann, 299-5133.
- STEREO PREAMPLIFIER, Eico Model HF85, new, wired, \$35. Kasperek, 344-7520.
- TRIMBLE bathinette, \$3; reinforced tire chains, size 6.50/13. Yunker, 299-5389.
- SKIS, 6'9" w/Cubco bindings, \$15; men's double ski boots, size 10, \$10. Pewe, 255-3518.
- '53 FORD 6, 2-dr., R&H, new brakes, ST, \$150. Miller, 255-2577.
- '51 PLYMOUTH 4dr. sedan, original owner, new tires, new seat covers, '65 license, \$90. Bradley, 298-2263.
- '62 VOLKSWAGEN, radio, w/w, sunroof, 12,000 miles, original owner, \$1250. Lynch, 298-7817.
- THREE doz. duck decoys, \$20. Geibel, 299-0275 after 5:30.
- STEREO PREAMPLIFIER, magnetic and tape head, \$9.95; transistor ignition kit, 12 vt, \$7.50; auto back-up light kit for Volks, \$5. Browning, 299-6384.
- SELL OR TRADE: circular saw, 10" large table, needs motor, \$40. Stuart, 299-9190.
- TR-4, '63, 14,000 miles, wire wheels, R&H, tonneau cover, black w/red interior, must sell, \$1895. Durgin, 298-3581.
- ALFALFA, 100 bales, \$100. Shafer, 898-0132.
- 3-BDR. & DEN, no qualifying, assume 5/4% GI, 1 1/2 baths, FP, double garage, perimeter heat, redecorated, \$19,400, \$1150 or car to mortgage. Courtin, 299-9056, 8504 Bellehaven Pl. NE.
- '59 CHEVROLET Biscayne, 4-dr., ST, R&H, recent overhaul and brake relining, \$550. Domme, 255-0133 after 5:30.
- '55 FORD Victoria, PS, power windows and seats, R&H, two tone, AT, \$195. Jones, 299-4900.
- 9 1/4 ACRES of farmland w/irrigation, San Antonio, N. Mex., 25 miles south of Socorro. Garcia 255-6929.

- 3-BDR, DR, den, LR, 1 1/4 bath, carpeting, garage, screened porch, FHA \$15,800, \$600 down. Emrick, 299-4176.
- 150-GAL. BUTANE TANK, \$50. Patterson, 877-3158.
- '55 PLYMOUTH Belvedere V-8, '65 plates, \$200. Paris, 298-2939.
- GO CART Mc G engine, alloy wheels, padded seat, slicks, live axle, \$125. Kuhn, 299-1898.
- SPRINGFIELD RIFLE, 30-06 caliber, model 03-A-3, semi-sporterized, w/sling, carrying case, cleaning kit, and 200 rounds of ammo. Alvino, 255-6339.
- ROYAL PORTABLE typewriter, magic margin control, elite type, touch control, case, \$30. Dehon, 898-2219.
- TWO TIRES, Sear's 7:50x14, driven 400 miles. Worden, 256-9594.
- CLOSE IN, unimproved large lots in NE, 75' and 84' fronts, \$2700 ea., terms. DeZeeuw, 344-7392.
- TWO 20" girl's bikes, \$15 ea., one of them is a Schwinn w/convertible crossbars. DeLollis, 299-5384.
- MOTORCYCLE, 1960 Harley Davidson 74, windshield, turn signals, saddle bags, \$895. Dziedulewicz, 256-1362.
- 3-BDR., den, Roberson, FP, 1 1/4 bath, double garage, pitched roof, built-in range/oven, AC, landscaped, large patio, \$18,800. Meyer, 298-4825.
- AXEL PETERSEN single shot sporting rifle, famous Denver gun maker, trade for flintlock pistols or old handguns. Smitha, 299-1096.
- LADY'S BICYCLE. Avallone, 256-0403.
- '59 CUSHMAN EAGLE, \$100. Seelbach, 299-5489.
- '59 FORD GALAXIE 4-dr. sedan, PS, AT, AC, R&H. Sandusky, 256-6224.
- CHROME PICNIC TABLE FRAME, \$5; tricycle, \$5; automobile top carrier, fits any car, \$15. Halliday, 256-6685.
- '62 FORD GALAXIE, 6-cyl., standard shift, 27,000 miles, must sell due to illness in family, \$1350. Garman, 242-6732.
- FRENCH POODLE, AKC registered, black miniature female, 11 mos. old, has had all shots, w/clippers, \$75. Tassia, 511 Utah SE.
- HOTPOINT automatic washing machine, \$50. Nix, 256-9545.
- '62 RAMBLER Classic 6-cyl., 4-dr., ST. Alden, 255-4827 after 5:30.
- SKI BOOTS, man's size 9E, Swiss-made Henke, \$15 Burns, 242-2407 evenings.

- KITCHEN TABLE w/4 red chairs, \$35; red tub chair, \$15; 2 modern green table lamps, \$10. Paul, 256-6228.
- REFRIGERATOR, Monitor, 9 cu. ft., \$30. Bertrand, 268-4191.
- 4 FORMALS, waltz length, size 10-11, \$10 ea. Longfellow, 299-7062.
- 3-BDR., den, 1 1/4 bath, DR, utility, garage, carpet, 2019 Somervell, Snowheights location, \$16,000 FHA appraisal. Jones, 298-3891.
- BICYCLE, girl's 20" Huffy Impala, thorn-proof tubes, \$15. Garst, 299-5870.
- GREY SIMONS Hide-A-Bed and chair, \$25; trailer hitch for '63 Rambler, \$8; Boston Terrier puppy w/shots, \$25; 2 dressers. Naumann, 298-3559.
- '62 FORD 2-dr. HT Galaxie 500, PS, PB, Cruiseomatic V-8 352, green and white, original owner. Freeman, 256-6661.
- BICYCLE, boy's 26" English lightweight; trailer hitch, universal type. Dadd, 299-6330, 9706 Morrow Rd. NE.
- ENCYCLOPEDIA Britannica Junior, yearbooks, unabridged dictionary, atlas, bookcase, \$45. Watterberg, 299-8517.
- TWO 7.00 x 15 8-hole split-rim wheels w/commercial 6 ply nylon tires. Fisher, 299-9235.
- '59 MERCEDES-BENZ 190 Sedan. Akin, 299-4242.
- 1933 ROLLS ROYCE Phantom II Continental, mechanically sound, original and unrestored Park Ward aluminum body, \$3000. Givens, 299-7781.
- ENGAGEMENT AND WEDDING BAND, size 5, 4/5 carat diamond, white gold, never used, will sell for \$250 cash. Pickens, 255-0361.
- '60 FORD F100 1/2-ton pickup, V-8 engine, w/canvas camper and bunks, custom cab, R&H, 3-sp. trans., 6 1/2" bed, 25,000 miles, below book, \$995. Fry, 298-1613.
- BABY CRIB w/springs, no mattress; baby stroller; complete 10-gal. fish aquarium. Cook, 299-7509.
- FOUR-PIECE SECTIONAL, naugahide covered, orange, \$65; size 9 shoe skates, \$5. Reed, 299-7425.
- BUTANE TANK, 23-gal. cap., 14" O.D. x 39" long, \$20. Gubbels, 299-8089.
- ELECTRIC HEATER, 1000 watts, 14" bowl, General Electric, \$3. Lynes, 268-0144.
- 2-BDR. HOME w/carpport, SE Heights, walled yard, clean, excellent neighborhood, \$9975 to qualified buyer. Causey, 299-0089.

- '63 FORD, Country Sedan station wagon, R&H, PB, PS, AC, Weldon, 255-8313.
- BENDIX DRYER, Hotpoint Washer, both in working order, make offer on one or both. Hoagland, 299-7097.
- 3-BDR. DEN, ROBERSON, carpeted, electric kitchen, landscaped, private courtyard, Mitchell School, near Eastdale, FHA appraisal, 3120 Blume NE. Martin, 299-1748.
- '64 TOHATSU 50 cc motorcycle. 9108 Snowheights NE, McCullough, 299-7426.
- WILLYS STATION WAGON, 1956, 6-cyl., 4 wd, \$695. Syroid, 299-8256.
- POLAROID CAMERA model 80 w/flash attachment and leather case, \$30. Bartlett, 268-6138.
- '58 FORD, 2-dr. HT, AT, R&H, transistor ignition installed, \$250. Carmichael, 4904 Pershing SE, 268-6083.

WANTED

- 5'5" SKIS, boots to match for 11-yr.-old; babysitter for afternoons after 3:45 daily, could use teenager. Pope, 268-7206 after 5:30.
- RIDER and/or driver to Denver, week end trip, departing Albuquerque Jan. 22, return Jan. 24 or 25. Villella, 299-6261.
- WISH TO TRADE RIDES or ride with someone to and from work, Bldg. 840. Uhl, 268-1855.
- 12-VOLT POWER PACK for model railroad; Childcraft or similar encyclopedia. Van Dusen, 298-1091.
- BICYCLE, boy's 26", good condition. Coleman, 299-2377.
- GOOD HOME for male Afghan Hound. Burroughs, 299-1851.
- MANLICHER-SCHOENAUER carbine or Mauser full stock carbine, will swap German lugers, Kentucky rifle and misc. swords. Smitha, 299-1096.

FOR RENT

- FURNISHED 3-bdr. house, carpeted, walled yard, good heating, air conditioning, SE, near shopping, busline, \$150. Campbell, 256-1015.
- ROOM AND GARAGE, new home, near base. Pouliot, 299-0492.

LOST AND FOUND

- LOST—Man's prescription glasses, turquoise drop earring. LOST AND FOUND, tel. 264-2757.
- FOUND—Prescription Glasses (in Honolulu), Lantern shaped pendant, Norelco electric shaver. LOST AND FOUND, tel. 264-2757.

New Radiography Equipment Gives Sandia Better Testing Capabilities

Additional radiography equipment installed in the new laboratory extension at the south end of Bldg. 860 will make available to many Sandia organizations more comprehensive information on results of non-destructive, environmental testing of components.

"Although we've had an x-ray lab for some time, the new facilities will provide better tools for testing and will expand our capability," according to R. W. Mottern of the Area I Laboratory. Radiography is the only means of examining sealed components without disassembly.

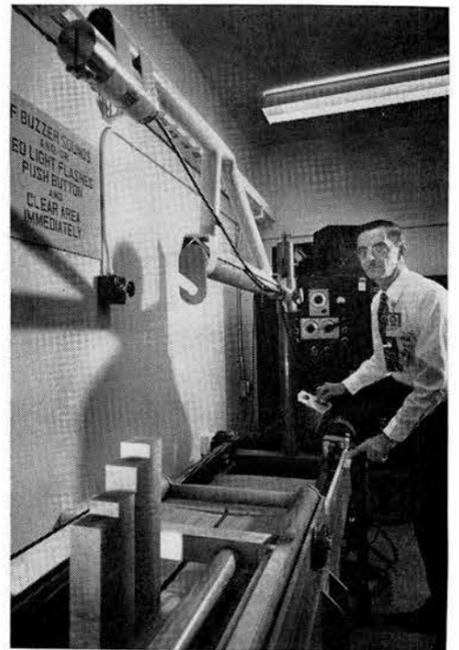
By the end of January, the laboratory will be in full operation, Mr. Mottern said, except for two major pieces of equipment: a microradiographic unit and a planned two-million volt x-ray machine.

The facility includes a viewing and projection room with light panels on the walls for examining x-rays, a slide projector and screen, a vu-graph for 14-in. x 17-in. x-rays, and a stereo viewer which uses a pair of slides to give the illusion of depth. "A good part of our work is discussing radiographs with engineers and designers. These aids help immensely," Mr. Mottern added.

In another room there is a TV x-ray system—essentially a TV tube which is sensitive to x-rays. A small component (such as a transistor) can be positioned in perhaps 20 different angles to pinpoint a defect. The viewer can see the defect magnified 18-20 times instantly on a 17-in. TV monitor.

A radiation gauge, named the DXT, can determine density variations when thickness dimensions are known or held. This instrument is primarily for use with plastics. A level of 50-100 kv is used with bulky plastics; for thin plastics soft x-rays of 5-50 kv could determine if the material is homogenous, with no voids or discontinuities. The thickness or atomic nature of the material being inspected determines the intensity and exposure time.

A high-ceilinged bay was designed primarily to accommodate the proposed two-million volt x-ray machine. The concrete walls are 14 in. thick on the sides and 40 in. thick on the south end. Construction is such that one-in.-thick lead sheets could be hung on the walls. At present the room contains a 300-kv x-ray machine which can be positioned vertically to allow for variation in intensity, exposure time, and size of target area. There is also a portable container with chambers for two sources,



PLASTIC CALIBRATION GAUGE is being used by Stuart A. Ravenbyrne in setting up a radiation micrometer which relates density to thickness.

one being Cobalt 60. Another portable container has an Iridium source.

All of the film exposed on the various machines will pass through an automatic film processing machine which produces a completely dry print in 12-14 minutes. A dry process x-ray copy film machine also is available for transparencies or opaque copies.

"Members of Health Physics Division worked closely with us in providing safety measures for personnel operating the equipment, a 'scram' button alert system, shielding, and interlock system," Mr. Mottern said.

Objects ranging upward from tiny transistors can be tested. Due to short periods of time involved, there is no lasting effect (or permanent change in atom structure) from the intense radioactive source.

The x-ray equipment can detect such things as voids in plastic encapsulated components or foreign materials (like solder balls or flakes in transistors) which could become dislodged during vibration and cause malfunction of a part.



A 300-KV INDUSTRIAL X-RAY UNIT is being positioned by Dennis J. Adkins preparatory to examining a sealed parachute case. The high ceiling and overhead crane provide easy handling for large objects.

Sandia Author

B. M. Butcher of Deformation of Materials Division and J. R. Canon, University of Illinois, "Influence of Work-Hardening on the Dynamic Stress-Strain Curves of 4340 Steel," December 1964 issue, *American Institute of Aeronautics and Astronautics Journal*.

Promotions

Edward H. Gallegos (4152) to Staff Member Administrative
 Jerome F. Durrie (1543) to Staff Associate Technical
 Andrew C. Wilken (2423) to Staff Associate Technical
 Sherry L. Smith (7256) to Staff Associate Technical
 George C. Garcia (7323) to Staff Assistant Technical
 Paul G. Dominguez (8213) to Staff Assistant Administrative
 David A. Paschal (2213) to Staff Assistant Draftsman
 Dawn A. Calek (3000) to Executive Secretary
 S. L. Gonzales (4622) to Shipping Clerk
 Roy A. Furrow (4574) to Janitor
 Charles R. Byrne (4631) to Technician
 Oscar H. Berlier (4513) to Sheet Metal Worker
 Jesse E. Harness, Jr. (5223) to Staff Assistant Technical
 Nonie Earl Brooks (2522) to Staff Assistant Administrative
 William J. Smith (4518) to Helper-Trades
 Shawkeet Hindi (2232) to Reproduction Equipment Operator
 Paul H. Gabaldon (3413) to Messenger
 Leslie E. Evans (2232) to Typist Clerk
 Helen L. Temperly (4151) to Accounting Clerk
 Patricia J. Apodaca (4371) to Steno Clerk
 Joseph G. Woodley (9411) to Data Processing Clerk
 Helen Zimmermann (5233) to Data Reduction Clerk
 James R. Rozell (4212) to Requisition Service Clerk
 J. Berman Sanchez (4212) to Property Clerk
 Dennis S. Chavez (2523) to Expeditor
 Lorraine M. Stamer (8234) to Record Clerk
 Gerald M. Hayhurst (2213) to Draftsman
 Marilyn H. Little (1300) to Secretary
 Josephine B. Hanna (4100) to Secretary
 Olivia V. Geffe (4600) to Secretary
 Margaret E. Marquez (3126) to Typist Clerk
 Mary H. Romero (3126) to Typist Clerk
 Mary Ann Saavedra (3126) to Typist Clerk
 Eloy D. Cota (3413) to Messenger
 Barbara S. Curry (3126) to Secretarial Steno
 Rey E. Smith (3126) to Secretary Steno
 Frank E. Arellano (3413) to Message Center Equipment Operator
 Jon N. Glanzer (3413) to Message Center Equipment Operator
 Bonnie C. Doggett (3421) to Library Assistant
 Alice E. Moore (3428) to Record Clerk
 Hilda Cruz (2231) to Typist (Tech. Stds.)
 Bonita I. Bryant (3421) to Library Assistant
 Catherine L. Fifield (3421) to Library Assistant
 Mary A. Bordenave (3126) to Senior Clerk
 Naomi M. Kelly (2552) to Senior Clerk
 Amy C. Anez (3241) to Service Clerk
 W. M. Whittington (2241) to Data Reduction Clerk
 Dennis C. Cordova (4611) to Control Analyst
 Vernon W. Westbrook (8232) to Mail Clerk
 Helen L. Allen (3462) to Composer

Int'l Symposium at Sandia Lab Concludes Proceedings Today

Sandia Corporation employees played an active role in preparing for the International Symposium on Packaging and Transportation of Radioactive Materials which started Tuesday and concluded today.

Some 350 registrants from the U.S. and foreign countries attended the four-day event which was jointly sponsored by the AEC and Sandia. Forty unclassified technical papers on transporting and handling radioactive materials were presented at the sessions.

James A. Sisler of Ancillary Equipment & Design Division was the chairman of the symposium committee. L. A. Faw of the same division was a member of the committee.

W. A. Gardner, Director of Systems Development, was master of ceremonies at the get-acquainted dinner. L. A. Dunn and

R. C. Gauerke were chairmen of technical sessions. B. E. Bader and J. A. Sisler presented technical papers.

Sandians serving on the symposium subcommittee included F. H. Viquesney, treasurer; J. O. Davis, entertainment; Mrs. Jean Gillette, arrangements coordinator; M. B. Gens, registrations and information; D. E. Grim, transportation arrangements; Mrs. Doreen Westfall, reservations; and Frank Diebold and Bob Gall, publicity.

Out-of-Hours Course Registration Deadline Tuesday, Jan. 19

Tuesday, Jan. 19, is the last day to enroll in Out-Of-Hours courses for the coming semester at Sandia Laboratory. Enrollment cards, schedule of classes, and course catalogs are available from Division secretaries. Classes will start the week of Feb. 8.

Enrollment cards, signed by the employee's immediate supervisor, must be turned in to Technical Training and Education by Jan. 19. Additional cards, booklets, and information are available from the Division, Bldg. 813, tel. 264-6538.

An Employee Bulletin was issued last week announcing additional courses not listed in the Out-Of-Hours catalog or supplement booklet. The courses are: Slide Rule, Electronic Circuit Analysis, Semiconductor Circuit Analysis, Ionic Equilibrium, Standard First Aid, and Advanced First Aid.

Classes are held during the noon hour and after work. Students are expected to meet the high standards of the program. Home work and examinations are part of the courses. Successful completion of a course is noted on the employee's personnel record.

W. F. Carstens to Teach UNM Credit Course in Technical Writing

W. F. Carstens, Manager of Technical Information Department, will teach a three-hour credit course, "Advanced Technical Writing—Engl. 320," next semester at the University of New Mexico. The course provides practice in the writing and editing of technical, engineering, and scientific reports and articles. It is designed for persons who use technical writing in connection with their jobs.

The classes will meet Tuesdays and Thursdays at 6:30 p.m. Prerequisites for the course are: "Creative Writing—Engl. 261," "Creative Writing, Description and Narration—Engl. 262," or "Informative Writing—Engl. 264"; or permission of the instructor.

For more information contact University Relations Division or Mr. Carstens.

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LAB NEWS

JANUARY 15, 1965

Sandia's Safety Scoreboard

Sandia Laboratory:

25 DAYS
 875,000 MAN HOURS
 WITHOUT A
 DISABLING INJURY

Livermore Laboratory:

146 DAYS
 733,000 MAN HOURS
 WITHOUT A
 DISABLING INJURY