



SURFACE CONTAMINATION of the space craft is checked by NASA's Ed Powers who presses a Rodac plate directly onto the cushioning material of the vehicle. The plate is incubated and the bacteria colonies, if any, which form are counted. Sandia's Vernon Arnold, right, assists in the study.

## Sandia Laminar Clean Room Used In Space Probe Contamination Test

Inside Sandia Laboratory's laminar down-flow clean room next to Bldg. 892 is a full-scale conceptual model of a planetary lander vehicle designed by Goddard Space Flight Center, a NASA agency. The planetary vehicle and its protective nose cone are being used in a study to evaluate biological contamination during assembly operations carried on inside the Sandia-designed clean room.

The scientific community has agreed that all planetary lander vehicles must be sterilized, using the best available techniques. Goddard Space Flight Center is currently considering the design of various contamination-free facilities for assembly and sterilization of space craft.

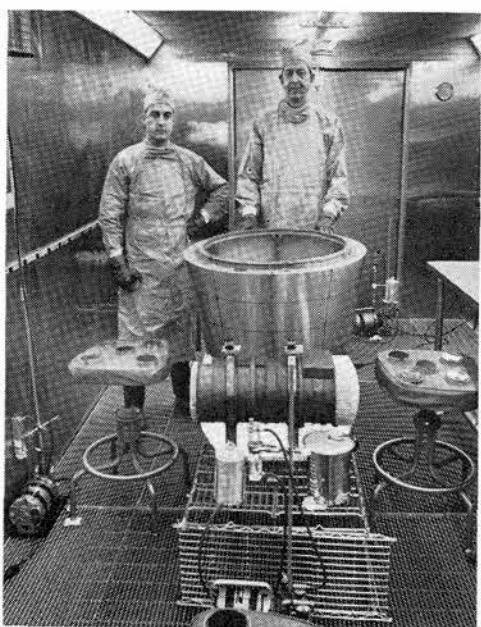
Laminar-flow clean rooms hold high promise for bacteria-free assembly environment, according to early studies made by Advanced Manufacturing Development Division, headed by D. W. Ballard.

As early as 1962, the first Sandia laminar-flow clean room was used by Lovelace Foundation to determine the bacteria count in the room during an operation on a laboratory animal. The results were judged very good when compared to the bacteria count of a hospital surgery room.

The Sandia clean room, based on the laminar flow principle invented by Willis Whitfield of the division, has revolutionized ultra-precise fabrication in industry. Laminar flow utilizes a continuous, uniform flow of filtered air—from ceiling to floor or from wall to wall—to remove contamination from the air within a room. Filters in the air stream stop particles 3/10's of a micron or larger, which provides an ideal environment for making thin films and miniaturized components. Since most bacteria and fungi are larger than 3/10's of a micron, the filters should also prove very effective in removing viable particles.

The joint Sandia-Goddard study in the clean room is being conducted by Edmund M. Powers, Goddard life scientist and microbiologist. He is being assisted by Vernon E. Arnold and other personnel of Advanced Manufacturing Development Division.

Several types of sampling techniques are being used in the study. Andersen air samplers, standard bacteria collection devices used by the Public Health Service, sample the air inside the room. Each one pulls one cu. ft. of air per minute through a system of agar plates. Several samplers are positioned in the room.



PLANETARY LANDER VEHICLE and bacteria sampling devices are being used in an evaluation of Sandia's clean room facility by NASA's Goddard Space Flight Center. Ed Powers, left, Goddard life scientist and microbiologist, and Vernon Arnold of Sandia's Advanced Manufacturing Development Division are participating in the study. Planetary space craft must be sterilized, and Sandia's clean room promises a very low contamination environment for assembly operations.

Open agar petri-dish collectors also are placed at designated points in the room to sample the "fall out" bacteria, those that settle on surfaces. Surface contamination is also being checked by pressing Rodac plates into contact with the probe vehicle and nose cone.

Similar tests were performed in a laminar cross-flow room through the cooperation of C. G. Electronics Division of Gulton Industries, Albuquerque. These tests were made during working hours and also while no operations were underway to compare the bacteria count of the two conditions.

"The evaluation of the effectiveness of the laminar down-flow room to control biological contamination is not yet complete," Ed Powers says, "but all indications point to an environment with a very low bacteria count. A complete report will be made when the data is evaluated."

SANDIA  
CORPORATION

# LAB NEWS

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

VOL. 17, NO. 5 / FEBRUARY 26, 1965



## Interservice Data Exchange Group To Meet in Albuquerque Mar. 16-18

More than 150 representatives of defense contractors and members of the armed forces are expected to attend the Third National Interservice Data Exchange Program (IDEP) conference to be held in Albuquerque Mar. 16-18. W. W. Westman, supervisor of Test Equipment Reliability and Engineering Design Practices Division, is arrangements chairman for the conference. L. F. Parman, manager of Technical Libraries Department, was instrumental in arranging for the IDEP conference to be held in Albuquerque.

Mr. Westman is a member of the IDEP Contractor Advisory Board, which is sponsoring the conference along with IDEP offices of the Army, Navy, and Air Force. The conference will be devoted to the de-

velopment and advancement of data interchange.

This year's conference theme is "Conservation of Men-Money-Time."

IDEP has achieved a free interchange of test and reliability information on components in missile and space systems among 164 defense contractors, agencies, and armed services laboratories.

D. H. Trent, Martin Marietta Co., Reliability, Test, and Evaluation Division, Orlando, Fla., is conference chairman. Assisting Mr. Westman with local arrangements are Shirley Blake, Jean Gillette, Doreen Westfall, and Jack Spence. Lt. Col. F. C. Lozito, FC/DASA, is assisting with military arrangements.

The conference will be held at the Western Skies Motor Hotel.

## Trading Stamps From Company Money Go to Good Cause

Next time you spend some Sandia money and receive trading stamps, don't be concerned. Take the stamps, turn them into Finance and they will find their way to a Veterans Administration Hospital.

J. E. Birchfiel of the Cash and Paymaster Section reports that all trading stamps coming to that office are forwarded to Finance of Albuquerque Operations of the AEC. That office, in turn, gives them to the Veterans Administration. Last year ALO handled 183,447 stamps.

Government regulations require that the stamps be turned in to proper channels. They must, according to the rules, go to the VA, Public Health Service, or Department of Defense. The DOD hands them to military hospitals.

The stamps are eventually used to buy recreational equipment, and occupational therapy material for patients.

So when you turn in your rented car (or otherwise qualify for trading stamps through spending company money) take the stamps. Jim Birchfiel will see that they get to the VA.

## Sandia's Technical Information Center Ready by April 17

The exterior of Sandia Laboratory's new library building is helping improve the face of the Tech Area. Workmen were entering the last phases of construction last week as scaffolding came down from the outside walls. The three-story addition to Bldg. 804 is scheduled for completion about Apr. 17, according to Plant Engineering Department project engineer John Snowdon.

Contractor crews will be working inside until then, John says, performing the finishing work.

The new addition will become Sandia Laboratory's technical information center. It will provide a central location for the shelving of the Laboratory's extensive report literature, plus, for the first time, a study and work area adjacent to the technical literature.

Some 125,000 documents, classified and unclassified, which the library now has in vault storage, will be shelved in the new addition. It will also accommodate other thousands of reports now scattered, little used, in files throughout the technical area.

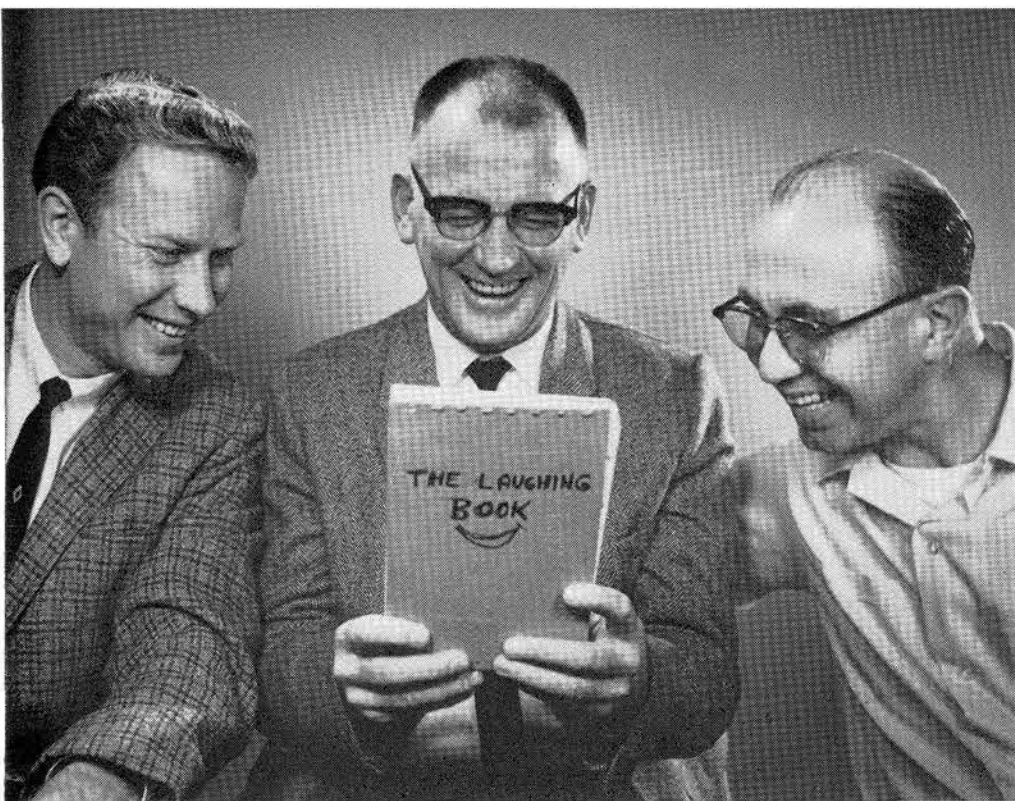
The new addition will provide office space for Classification Division, a department manager's office and new classified card filing equipment as well.

After construction is complete, the new addition should be open and ready for use within two or three weeks, according to L. F. Parman, manager of Technical Libraries Department. The move is being planned, he reports, and new equipment for the addition is either on hand or on order.

CONSTRUCTION of Sandia Laboratory's new three-story library addition, Bldg. 804, is scheduled for completion Apr. 17. John Snowdon, left, Plant Engineering Department project engineer, and L. F. Parman, manager of Technical Libraries Department, review plans for the information center.







CLICHES, a collection of 909 recorded since 1958 in "The Laughing Book," amuse (l to r) Herb Floyd, Dick Davis, and Frank Daut of Electronic Components Division.

The men used only authentic Sandia Laboratory-type cliches, made the journal entries to help promote precision thinking, and reaped laughs as demonstrated below.

## A Meeting of the Minds Brings Some Fine-Toothed Comb Decision

The following dialogue could be a transcript of a meeting held in almost any company in the country. Even if it sounds exaggerated, we have to admit there is an echo of something familiar. Read on—you are about to encounter a climactic cliche conference.

"Men, you know what the meeting was called for. Let's lay our cards on the table."

"Well, we've had to blow the whistle on this program. The ABC is way out in left field."

"I don't see such a big flap on this. We're just whistling Dixie."

"Right. We sawed this bridge off when we went across. Everyone wants to light a fire but no one wants to carry the wood."

"Nevertheless, our program is running on the ragged edge. The handwriting is on the wall."

"We didn't cross our T's and dot our I's, so we'll have to re-work the circuit."

"If you do it that way, all bets are off. There's no use watering it down."

"This thing can be thrown together by XYZ. Send it back and let it bounce around awhile."

"As long as we get it in the right ballpark, it will fly."

"We'll use the shotgun ap-

proach. We'll stand back and pull both triggers."

"Don't frame it up until you can find a way to back out, otherwise we'll be left holding the bag."

"Is Purchasing on top of this one?"

"Yeah, they filled the bill with that long list."

"If we want to do hand-springs, we'd better spring a few hands ourselves."

"Well, we're not buying a pig in a poke."

"I'm sitting here fat, dumb, and happy thinking everything is rosy."

"We can still spring this one loose."

"Sure, all we have to do is rattle some chains and shake the grates. We might come out with a horse of another animal."

"Well, send it out into the tall grass and see what it eats."

"No problem, as long as we stay loose in the saddle. We've got it whittled down to nothing already. After the qualification, we're off to the races."

"There's still some loose ends here. I'll take 'em home and woodshed them tonight."

"OK, then we have an 8 o'clock pow wow and see where we stand. We can shut this door from all angles. It's been a good productive meeting men. See you in the morning."

versation, it's done for a laugh," Dick says. "One thing for the better—cliches have disappeared from our report writing. At least I hope so. One of the problems of cliches is they become part of our thinking. A generalization is easier to think of than a specific. You can't win for losing, or something like that."

## Promotions

Marian R. Clark (3126) to Secretarial Steno  
Kay Collins (3421) to Library Assistant  
Bonnie C. Gallo (3421) to Library Assistant  
Laroyce J. Moseley (3421) to Library Assistant  
Florindo Salas (2232) to Reproduction Service Clerk  
Lois E. Edwards (2231) to Service Clerk  
Ernest Sanchez (3462) to Camera Operator  
M. French Stewart III (2232) to Microfilm Equipment Operator

Edward M. Gullick (4573) to Service Clerk  
Arthur D. Bacon (4611) to Property Clerk  
Ernest J. Church (9411) to Computer Facility Operator  
Billy J. King (9411) to Computer Facility Operator  
George Martinez (9411) to Computer Facility Operator  
Maximo Martinez (9411) to Computer Facility Operator  
Paul Martinez (9411) to Computer Facility Operator  
Lois H. Payne (9411) to Computer Facility Operator  
F. G. Sanchez, Jr. (9411) to Computer Facility Operator  
Hyacinth M. Walker (9411) to Computer Facility Operator  
Gerald L. Williams (9411) to Computer Facility Operator  
E. Pauline Frey (9411) to Computer Facility Operator  
Joe Maria Sanchez (2552) to Order Analyst  
Sherwood J. Embry (2132) to Order Analyst  
Mergie V. Pope (4630) to Secretary  
Catherine H. Wille (5120) to Secretary  
Malery T. Jones (4574) to Janitor  
Jose A. Gutierrez (4574) to Cleaner  
Rudy Lucero (4614) to Utility Operator  
Ludwig A. Eversgerd (4513) to Sheet Metal Worker  
J. A. Paulhamus (2564) to Staff Associate, Technical  
Elvis E. Skidgel (8122) to Staff Associate, Technical  
Henry D. Sorensen (8124) to Staff Associate, Technical  
Thomas F. Jones (8141) to Staff Associate, Technical  
Elmer E. Smith (8151) to Staff Associate, Technical  
Theodore W. Sneddon (8151) to Staff Associate, Technical

## 'Laughing Book' Is Source of Cliches Used in Above Tale

The accompanying account of a meeting conducted entirely in cliches was assembled from "The Laughing Book," a journal of more than 900 entries initiated by Herb Floyd, Jr., and compiled by Dick Davis and men of Electronic Components Division.

The book was started back in 1958 with no other aim than to record a few cliches so that, hopefully, they wouldn't be used again. Through the years, however, the book has grown and the title has been added. You can't read it without breaking up.

"Don't jump to black and white conclusions," Herb says. "The book does serve a purpose other than humor. By recording them, cliches are brought into the open. We have at least become aware of them and can recognize one when we hear it. This helps. Too many times a cliche is a substitute for precision thinking."

All of the 900-plus cliches in the book are authentic. They were used at Sandia and overheard by one of the contributors who took note and recorded it.

"Nowadays, if we use a cliche in con-

# Your Emotions And Physical Health

The first in this series of articles pointed out that emotions do cause pain and suffering and that these symptoms and their causes should not be ignored. This second article discusses the symptoms brought on by the everyday emotions we experience.

## Part II

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

Doctors base on sound facts their knowledge that emotions play an important part in many types of physical illness. These facts are familiar. In everyday situations, all of us have experienced some of the effects of emotions on bodily functions.

Most of us can recall blushing when embarrassed. Many of us have had a dryness in our throats when we were extremely anxious. We lose our appetites when in-

tensely worried. We have all had our hearts beat harder and faster and our hands perspire when we were suddenly excited or afraid.

These are normal, everyday reactions of the human body to specific situations. They are beyond our control. Fortunately, they disappear quickly once the cause is removed.

According to *Today's Health*, a publication of the American Medical Association, when such bodily changes occur, they normally should do so. Emotion is really meant to make us act.

For example, fear affects the whole body. The eyes open wider, the pupils dilate. The heart beats faster and the blood pressure goes up. The breath may be held for a moment; then breathing becomes fast and deep. The little muscles in the skin contract, making the hairs stand up; this causes the curious appearance called gooseflesh, and the person feels a creeping sensation in his scalp.

The blood vessels of his intestines and stomach contract, forcing the blood out into the general circulation to make it available to the muscles. Even the salivary glands contract. The secretion of saliva stops so that the mouth becomes dry.

The blood vessels and the large muscles become dilated to receive the added blood flow, and the person may be able to run faster or lift weights heavier than he would have thought possible. Many of these effects are caused by the appearance of adrenalin in the blood, but, whatever the explanation, they prepare the body to run, to fight, to defend, or to challenge. The important thing is to note that fear affects the whole body.

Knowing how these normal, everyday emotions influence bodily functions, we should be better able to understand how strong and persistent emotional conflicts, day in and day out, over a period of time, disturb the workings of the body organs, particularly the heart and the stomach. It is believed that in some cases conflicts can eventually result in some change in the organ itself.

The next article in this series explains that sometimes a person's emotional conflicts are so difficult for him to accept that he represses his feelings altogether. Also pointed out is that worry can influence the severity and duration of any illness.

## Governor's Advisory Committee Here This Afternoon

Members of New Mexico Governor Jack M. Campbell's Scientific Advisory Committee will visit Sandia Laboratory this afternoon. Sandia Vice President Glenn A. Fowler, a member of the committee, will host the 12-man group.

Committee members will meet at 1:30 p.m. at the Sphere of Science for a welcome from S. P. Schwartz, Sandia Corporation President. Following the address, they will tour the Wind Tunnel and Plasma Jet Facility in Bldg. 865 with A. Y. Pope, Director of Aero Projects, conducting the visit.

From 2:50 to 3:40, C. F. Bild, Director of Materials and Process Development, will conduct a tour through the Materials Laboratories in Bldg. 805.

W. C. Scrivner, Director of Computing, will guide committee members through Sandia's 7090 and 3600 computing facilities in Bldg. 880 from 3:50 to 4:30, when the group will return to the Sphere. The Advisory Committee will meet tomorrow in Albuquerque. Purpose of the committee is to advise the governor on the scientific and technical resources of New Mexico.



Barbara Therkindson (3126)

## Take a Memo Please

Safety requires constant alertness, attention to details, and adherence to approved practices and procedures.

PAGE TWO

LAB NEWS

FEBRUARY 26, 1965

## SANDIA CORPORATION LAB NEWS



ALBUQUERQUE, NEW MEXICO • LIVERMORE, CALIFORNIA

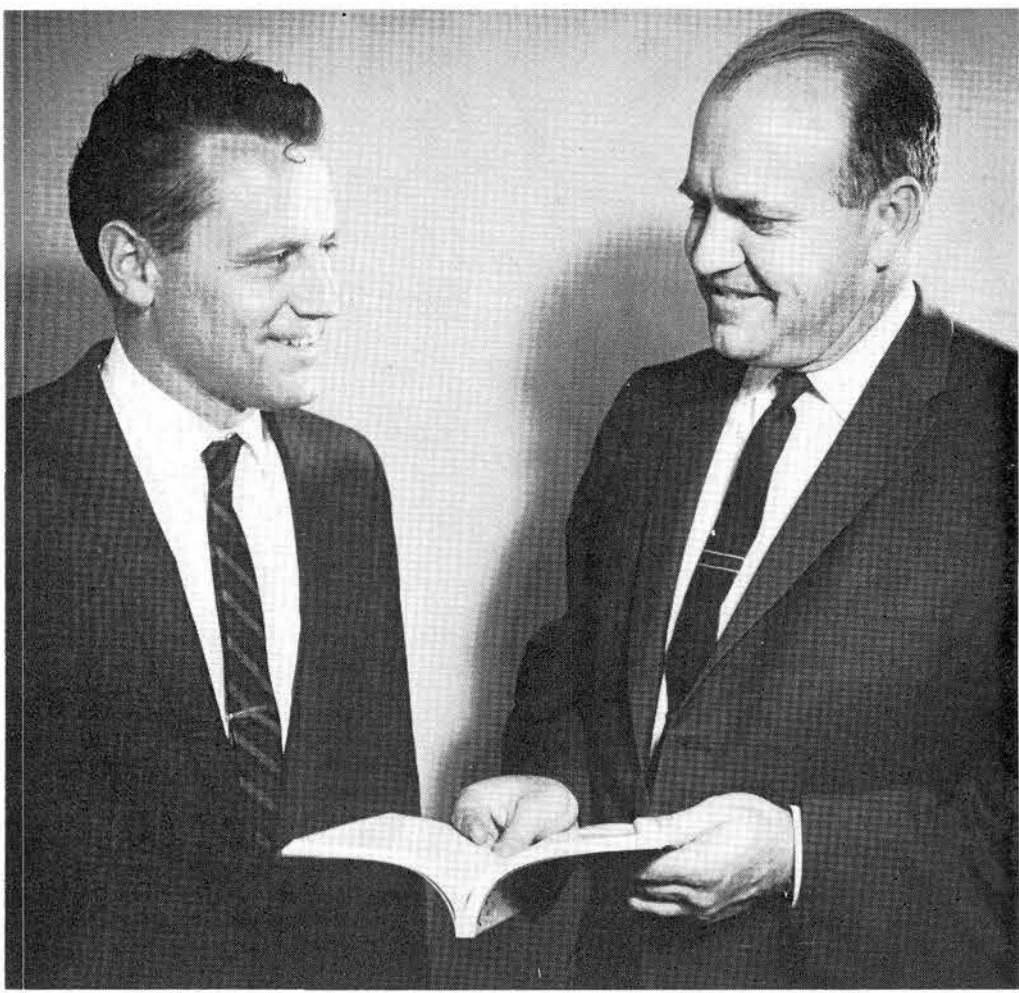
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Jack Tischhauser and Harry Kinney  
—Serving on Bernalillo County Advisory Committee—

## Two Sandia Employees Appointed To Bernalillo County Committees

Two Sandians are serving on new Bernalillo County advisory committees in non-partisan capacity.

Harry E. Kinney of Advanced Systems Development Department II was appointed to the Budget and Finance Advisory Committee and Jack L. Tischhauser, manager of Programming Department, was named to the Data Processing Advisory Committee. Both committees are new. Each has three members plus one of the County Commissioners.

Harry's committee is studying the county's financial picture and attempting to predict future trends. Its recommendations will be in the form of a long range program. The other appointed members of this committee include the comptroller of the University of New Mexico and the former commissioner of the State Bureau of Revenue.

The Data Processing Advisory Committee has already looked over the existing use of automated equipment by the County Commission and has made a report. The committee will continue in an advisory manner to help other county officials program administrative tasks on

tape, review any proposed changes, and screen any prospective data processing personnel. The other advisory committee members are a representative from UNM's data processing center and a bank official also active in this particular field.

## Take Note . . .

Gibson Hart Company, Kansas City, Mo., has been awarded a contract for a construction project at Sandia Laboratory's steam plant. The firm bid \$479,500, according to the Atomic Energy Commission.

The project will include additions to the existing steam production system and building, installation of a 5000-barrel fuel oil storage tank and transfer facilities, site improvements, electrical power service improvements, and other work related to steam generating facilities. The project is to be completed in September 1965.

C. C. Whitcomb is the Plant Engineering Department project engineer.

The Albuquerque Retriever Club is seeking new members—persons interested in training their dogs for field trial competition and for effective field work on game birds. The group meets monthly.

Currently members are training their dogs for field trials to be held in May in Colorado Springs and Denver, Colo., and Cheyenne, Wyo.

Sandians who are members of the club are G. A. Coburn, D. E. Alberts, L. W. Stouder, and T. S. Church.

Anyone wishing to know more about the organization may contact Guy Coburn, member of the board of directors, tel. 268-6844.

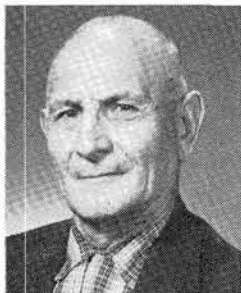
Registration is now underway for the Sandia Laboratory Employees Golf Association and for the Sandia Laboratory Women's Golf Association. Weekend and evening play will begin in April for both leagues. Special tournaments are scheduled throughout the summer. To register or for additional information call O. J. Foster of Benefits and Services Division, tel. 264-7775. Deadline for registration is Apr. 1.

At a special meeting recently, Sandia Toastmasters Club 765 presented an award to L. A. Hanchey of Aerospace Nuclear Safety Division IV, as winner of their annual speech contest.

P. C. Hernandez of Ordnance Test Projects Division I was also presented an award for being the club's Outstanding Toastmaster of 1964.

Sandia Toastmasters is one of the thousands of organized groups of men throughout the world who seek to improve their speaking ability. The club meets weekly at 6:30 p.m. at the Trade Winds Motel restaurant.

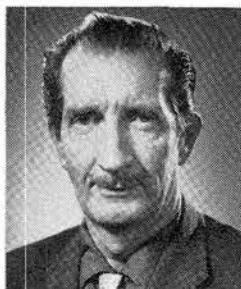
## Deaths . . .



Jose M. Holcomb, who retired from Sandia Corporation seven years ago, died in Albuquerque Feb. 6. He was 72.

While at Sandia he worked as an assembler.

Survivors include his widow and six children: Lorenzo B. (who works in Stock and Material Control Division), Ernest M., Jose M., Jr., Raymond L., Mrs. Anna Trujillo, all of Albuquerque, and Mrs. Alice Vigil of La Puente, Calif.



Wallace T. Smith, a Sandia Corporation employee for more than 16 years, died in a Houston, Tex., hospital, Feb. 13. He was 50.

Mr. Smith was supervisor of Diagnostic Aircraft Operations Division in the Field Testing Organization.

He is survived by his wife Dorothy, of Albuquerque, and a sister, Susanne McGrotten in New York.

## 500 Tons TNT Set Off 2000 Feet From Ship Carrying Three Sandians

Three Sandians were aboard a "guinea pig" cruiser and eight others manned microbarograph stations when the Navy conducted the first huge TNT test of Operation "Sailor Hat" on Feb. 6 in the Hawaiian Islands.

Five hundred tons of TNT (with air blast overpressures equivalent to a one-kiloton nuclear explosion) were set off on Kahoolawe, an uninhabited island about 18 miles from Maui. The island has been used for years as a military target. Under sponsorship of the Defense Atomic Support Agency, the U.S. Navy is conducting the tests to determine the ability of modern and future ship structures to withstand high level underwater shock and air blast pressures.

The scientific advisor for long-range blast predictions was Jack W. Reed of Underground Physics Division. Assisting him was L. B. Smith of Atomic Particle Physics Division. Post-shot crater measurements were made by L. J. Vortman of Underground Physics Division. During the explosion these three were aboard the USS Atlanta, a World War II-vintage light cruiser which underwent \$4 million worth of refittings for this test series. The ship was anchored about 2000 ft. from the blast site and was positioned to take the shock wave broadside.

Project officer for microbarograph instrumentation was W. A. Maupin. Assisting him were J. H. Morrison, R. E. Pritchett, R. A. Poe, and L. A. Hitchcock, all of Field Testing Organization; Barry Bodhaine of Underground Physics Division; and Hugh I. McLaren and E. G. Connelly of Logistics and Procurement Department. The Sandia-operated micro-

barograph stations were located in Honolulu; Lanai City on the island of Lanai; the Lahaina city hall on Maui; the Bureau of Standards WWVH time station at Kihei on Maui; Kailua-Kona on the island of Hawaii; and the Hilo campus of the University of Hawaii.

When the Atlanta was refitted, two guided missile deck houses, an array of radar antennas, and an assortment of rocket and missile launchers were added. One of the new deck houses is a replica of the type on today's guided missile frigates, and the other is constructed of a new "blast hardened" aluminum. Also taking part in the test were the U. S. guided missile destroyer Cochrane, anchored about 4000 ft. from the blast, and the Canadian destroyer-escort Fraser, anchored about 3000 ft. from the explosion.

According to Navy accounts, there was no major damage to any of the ships nor was there any injury to crew members and others on the three vessels. There was no reported damage on the island of Maui; however, Jack Reed noted that the jet stream picked up the detonation sound and caused a loud noise at Hana, Maui.

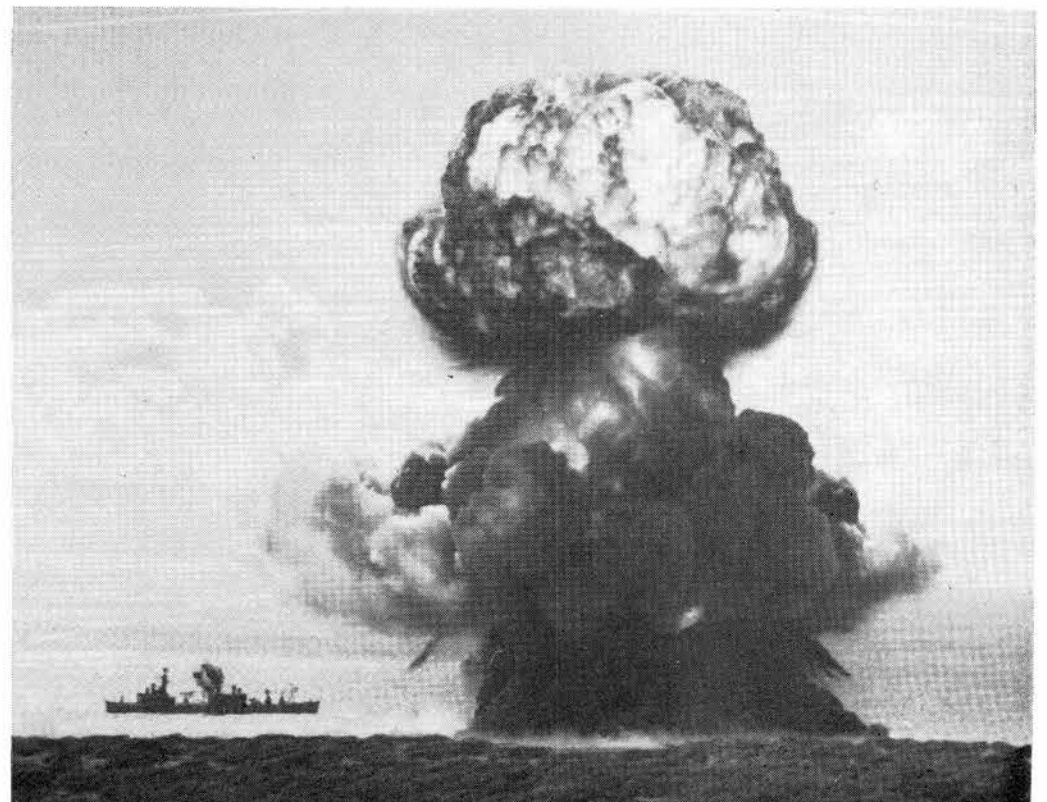
The second shot of the Sailor Hat series is tentatively set for mid-April and the third for mid-June. Each time the USS Atlanta will be moved closer to the charge until it receives an estimated pressure of 10 lb./sq. in. from the explosion. Detailed surveys of damage to the target ship will be made after each experiment.

Scientists will employ a scaling process on data collected from the three conventional-explosive tests to determine exactly what would have happened to the ships in a blast of much greater magnitude.



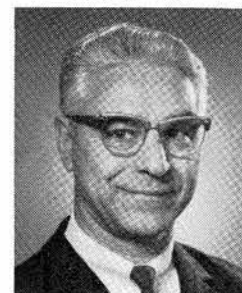
500 TONS OF TNT were stacked in this configuration before being detonated on the island of Kahoolawe this month. Three Sandians were on the ship anchored 2000 ft. from the blast.

FLAMES SHOT 500 ft. high from detonation of 500 tons of TNT before smoke formed a mushroom-shaped cloud. Target ship, USS Atlanta, was undamaged from blast effects in this Naval experiment.





20 Years

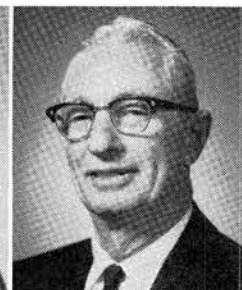


Albert J. Rizzoli  
2562  
Mar. 5, 1945

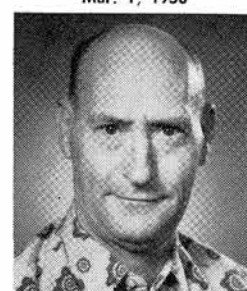
15 Years



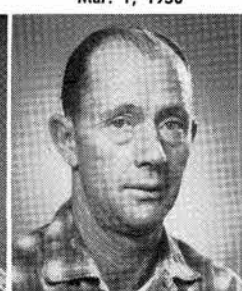
Louis E. Aragon  
2531  
Mar. 1, 1950



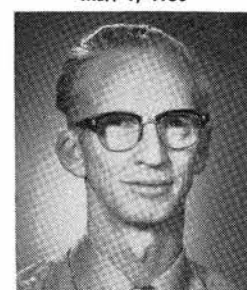
Walter H. Martin  
4512  
Mar. 1, 1950



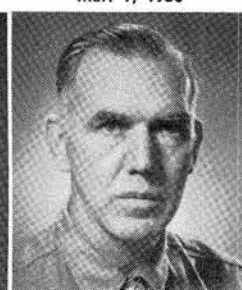
Harold A. Nouhaus  
4512  
Mar. 1, 1950



John L. Sullivan  
4575  
Mar. 1, 1950



David T. Reed  
2444  
Mar. 2, 1950



Robert I. Orr  
4512  
Mar. 2, 1950



Frieda P. Salazar  
2500  
Mar. 7, 1950



Dean S. Wise  
4231  
Mar. 12, 1950

10 Years

Mar. 1-12

Lawrence L. Lodge 1112, Donovan B. Browning 1331, Howard M. Stuart 2136, Robert W. Seavey 2423, and Paul D. Seward 2551.

TO CHICAGO TOURNEY—Walt Howerton, right, of Ordnance Test Projects Division II and his wife Barbara, winners in Region Six of the National Industrial Recreation Association Duplicate Bridge Tournament, receive an expense-paid trip to Chicago Mar. 26-28 to compete in the national play-offs. J. N. Johnson, left, supervisor of Services and Benefits Division and NIRA representative, makes the award.

# Rutherford And The Atomic Nucleus

by C. C. Hudson

This article is another chapter in the Science Series being presented by the Lab News. Author Craig Hudson, Theory and Analysis Division of the Nuclear Burst Physics Department, wrote the last article concerning J. J. Thomson. This article, which will be presented in two parts, tells the fascinating story of one of Thomson's research students.

Part I

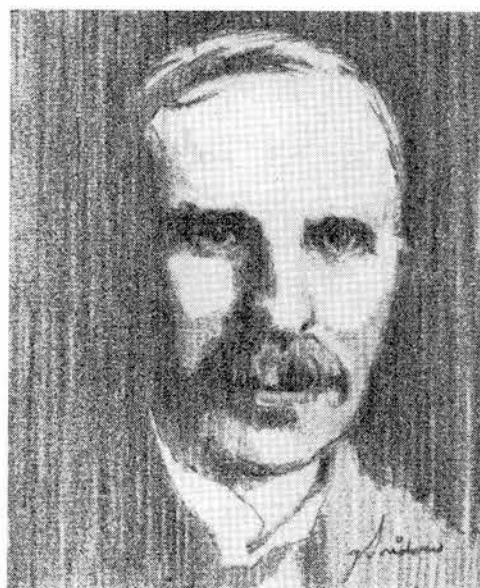
We saw in the previous chapter how J. J. Thomson, exploiting the discoveries of Roentgen and Crookes, opened up modern physics by proving the atom to be electrified and divisible. Ernest Rutherford, one of Thomson's first research students, then showed that the atom consists of a heavy charged nucleus surrounded by negative charge. It is difficult to exaggerate the importance of this discovery; all of present day chemistry, nuclear science, and electronics is based indirectly on it. One of Rutherford's students, Niels Bohr, described the structure of the negative charge cloud, so the present day model is often called the Rutherford-Bohr atom.

How did Rutherford have the insight to make the daring hypothesis that the atom had a heavy core? It was based, of course, on a long series of smaller discoveries. Let's see what the background of this remarkable man was, and how he was led step by step from the life of a farmer in a distant colony to that of one of the great scientists of all time.

Ernest Rutherford was born and raised in New Zealand. His parents emigrated from Scotland in the 1850's and met and married in New Zealand. Ernest was fourth of 12 children, and apparently was the most gifted because he was kept in school sometimes at considerable hardship to his family. His father was a wheelwright, an energetic imaginative man who tried farming, bridge building, and contracting to support the family. Eventually, after Ernest left, Mr. Rutherford achieved fair success with a flax mill. His mother was a dignified woman who valued education and music, and played the piano.

Rutherford was a very successful student, winning scholarships and prizes in Latin, French, history, and science; and he was always first in mathematics. As was the case with Thomson, he was fortunate to fall at an early age into the care of a sympathetic tutor well-grounded in mathematics, with whom he became closely attached. He entered Canterbury College, Christ Church, part of the University of New Zealand, in 1889 at the age of 18. He was then described by a fellow student as "boyish, frank, and simple; a very likeable youth with no precocious genius, but when once he saw his goal, he went straight to the central point." He spent five years at this school, most of it as an honors student, and obtained the B, Sc, and MS degrees. He did research on the detection of radio waves and published two papers in the New Zealand Institute Transactions. It was these papers which won for him the special scholarship to Cambridge to work with J. J. Thomson. He was in his father's field digging potatoes when he received the letter, and his mother recorded that he threw down the fork and declared "that's the last potato I'll ever dig!" It was.

At the time Rutherford arrived at Cambridge (1895) it was barely possible to detect radio waves a few yards from the source. At Christ Church, he had invented a technique for detecting waves using magnetized steel needles. With the needles as the core of a coil of wire attached to a sort of antenna, a Hertz generator (a crude radio transmitter) nearby could be detected by observing the increase of magnetization in the needles. By dissolving off the outer layers of metal with acid, he showed the core to be unmagnetized. At Cambridge, by setting up the generator in one building and the detector in another, Rutherford was able to make a rather impressive dem-



onstration of wave propagation, far ahead of any other experimenter of his time. He recognized the economic significance of his experiments, because he writes "If I could get an appreciable effect at 10 miles, I would probably be able to make a considerable amount of money out of it, for it would be of great service to connect light-houses and lightships to the shore, so that signals could be sent at any time." Eventually he was able to receive signals at a distance of 3/4 mile through heavy stone walls, but he never made more than a few dollars in prizes for his efforts.

During the years 1895-1898, Rutherford worked with Thomson on the production of x-rays and electric discharges in gases, aiding Thomson in establishing his theory of ionization. Rutherford and J. S. E. Townsend were the first two Research Students at Cambridge, the post just having been established by Thomson. Townsend stayed in the field of electric discharges and later established the main features of the modern theory. Rutherford showed that negative charges were formed near a clean zinc plate exposed to ultraviolet light (now known as the photoelectric effect). But then he came across an exciting idea that changed his life — and science.

It is amusing to pause a moment and consider the significance of these crucial points where the road branches. Townsend and Rutherford stood together at the juncture, but Townsend continued in the gas discharge work although (as he wrote Rutherford later) he was bored with it. Rutherford's perhaps idle curiosity led him into a field that was later to open up. What clues were there for him? Before Roentgen had discovered x-rays, another scientist had observed his photographic plates darkened, too. There was a clue; but he told his assistant to store them in another place, and thereby he sidestepped immortality.

In 1896 Becquerel in Paris found that uranium gave off an emanation that would darken photographic plates, just as x-rays did. In order to see if these rays produced ions in air, and if so to see if these ions behaved as those produced by x-rays, Rutherford began to experiment with radioactive materials. He found that two kinds of rays were given off, which he called alpha and beta. He distinguished them by their penetrating power—that is, by their ability to penetrate materials of various thickness. The alphas were stopped by a stout sheet of paper, whereas the betas were a hundred times as penetrating.

At this point, Rutherford received an appointment as professor of physics at McGill University in Montreal, Canada. The appointment came very probably as the result of the strongest kind of recommendation by J. J. Thomson. Although Rutherford later received 23 honorary doctor degrees, he became professor at McGill with no more scholastic honors than he had when he left New Zealand.

Since 1895, Rutherford had faithfully been writing his sweetheart Mary Newton in New Zealand, whom he had met at Christ Church. In these letters he described his trials and achievements and, incidentally, exposed his personality. He was certainly an intelligent man, but hardly brilliant. Perhaps the strongest

personality traits were his forcefulness, his self-confidence—even to appearing cocky, and his single-mindedness. He was, of course, enormously energetic, well-read, methodical, and unusually jolly, but one could not call him sophisticated. He was occasionally thought to be a farmer by those who didn't recognize him. By 1900 he had saved enough money to go to New Zealand and return with Mary Newton as his wife. His life with her was tranquil and orderly, leaving most of his time for laboratory work.

Rutherford stayed at McGill from 1898 to 1907. He was joined by Soddy from 1900 to 1903 and between them they unraveled much of the mystery of natural radioactivity. One must recall that at this time the only tools one had to detect charged particles were the photographic plate and the electroscope. J. J. Thomson wrote Rutherford in July 1899 about C. T. R. Wilson's cloud chamber, but it was not immediately a very useful device. Alpha particles did not affect a photographic plate (probably because of the light-proof wrapping) and beta particles often did not affect the electroscope. The electrical properties of the beta rays, however, soon allowed them to be associated with Thomson's electrons; but it was not until 1903 after an enormous amount of meticulous experimentation that Rutherford succeeded in deviating alpha rays by electric and magnetic fields, proving that they were very heavy positively charged particles. He later showed that they were indeed nuclei of helium atoms. A third emanation, gamma rays, masquerading now as alphas, now as betas, was positively identified by Villard in 1900 as a true electromagnetic radiation. The three emanations were accurately distinguished by their penetrating ability. The thicknesses of aluminum required to reduce the beam intensity by half were: 0.005 cm for alphas, 0.05 cm for betas, and 8 cm for gamma.

During 1902-3, Rutherford and Soddy established the theory of natural radioactivity by asserting:

- (1) From the radioactive elements uranium, thorium and radium there is a continuous production of new kinds of matter, also radioactive, by the spontaneous disintegration of the parent atoms.
- (2) There are no comparable changes in the chemistry of atoms, the energy liberated by decay being many orders of magnitude greater per atom than chemical energies.
- (3) The number of atoms that disintegrate per unit time is a definite fraction of the number of atoms remaining.

The period at McGill was important for Rutherford partly because it established him as a scientist of the first class; but even more, it allowed him to become intimately familiar with the properties of alpha particles, and this was soon to lead to his greatest achievement.

The final portion of this article will tell of Rutherford's life at the University of Manchester and of the brilliant young aspiring physicists who studied with him.





# Reinforced Plastic Is The First New Construction Material Created by Man

In 1200 B.C., Egyptian beads, amulets, and figurines were decorated with glass threads less than 0.012 in. in diameter. Decorative patterns were laid on bottles by heating the glass threads, then wrapping them around the bottle, pulling with a special tool while the glass threads were hot. A smoother outer surface was produced on the threads and can be seen today on artifacts discovered from that era.

Glass-fiber threads are used at Livermore Laboratory in a surprisingly similar fashion, but not for the ornamentation of artifacts. Unless, perhaps, weaponry is an artifact of the 20th Century.

The ancient Egyptians are responsible for a significant number of achievements, the benefits of which we have casually absorbed into our lives. Techniques developed as early as 1500 B.C. by the Egyptians in forming molten glass could only be described as ingenious. And the basis for our present techniques derives extensively from this origin.

## Reinforced Plastics

Today industry is fertile with proposed applications of what is called "reinforced plastics." Exotic uses of high strength plastics are evident in practically every endeavor. Household ornaments. Jewelry. Sports equipment. Automobiles. Medical equipment. Aviation. What product does not use reinforced plastics in some form?

A glass on the cupboard shelf, or a fragile glass vase, hardly seem related to a material capable of withstanding tensile loads of over 500,000 lbs. per sq. in. Yet, the basic composition of the common drinking glass, so easily broken, and of glass fiber used in filament winding is the same.

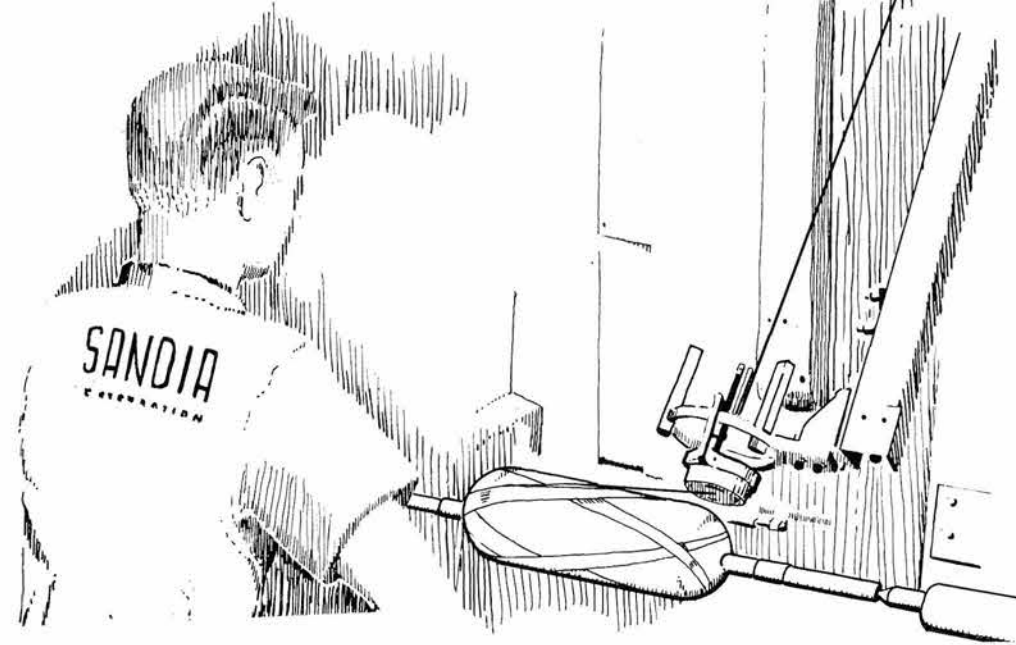
In centuries of technological improvements, reinforced plastic is the first new construction material created by man. He specified properties for polymers, then re-assembled natural molecules into these polymers with natural or synthetic fibers to form composite structures having an amazing strength-to-weight ratio.

## Many Advantages

"Selection of a single property of reinforced plastics as the most outstanding would meet with well founded controversy," said structural engineer Tom Lane. "Application determines the desirability of any particular property; but at Sandia, where filament winding is an important development project, the advantages of selective directional properties are probably the most significant."

As explained by George Dunbar of Materials Application Division, filament winding produces several unusual characteristics, two of which distinguish this form from other plastics.

First, as different from products using a mat or cloth-like fiber material, filament-wound structures use a unidirectional, fib-



rous material in the form of either tape, filament, or roving.

Second, the reinforcement is wound on a mandrel (hence, the term "filament wound") after being impregnated with a resin, or impregnated during the winding. The cured filament-wound structure conforms to the shape of the mandrel, and after wrapping is removed from the mandrel and machined to the precise dimensions. In some instances the mandrel is formed by a part that is wrapped, cocoon-fashion, to be encased for an indefinite period.

The advantages of reinforced plastics are many. Some of the most outstanding are:

1. Greater design freedom than for most other materials,
2. Economy,
3. High strength-to-weight ratio,
4. High dielectric and thermal insulation properties,
5. Superior weathering properties, and
6. Corrosion and chemical resistance.

At Sandia, design freedom and economy are factors that make reinforced plastics desirable. The capability of reinforcing against a particular stress leads to some highly specialized uses. For example, in designing a shape that may be subjected to high bending loads, the shape can be wrapped to withstand that load without increasing weight. An added advantage is that this reinforcement is accomplished during the initial building of the part.

On a particular shape wrapped at Livermore Laboratory, the wall thickness of the

part was tapered, selectively reinforcing the area that would receive the greatest stress. This eliminated substantial weight, which if done with any other material would involve almost prohibitive cost and would result in a significant weight penalty.

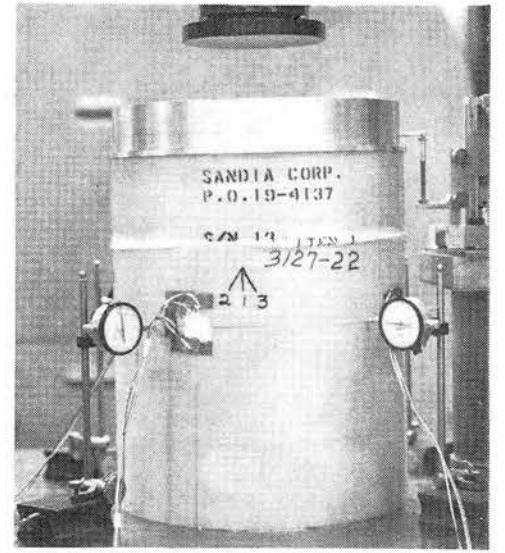
## Research at Sandia

Sandia occupies a unique position relative to filament winding. Few industries have a need to experiment with the variety of shapes and loading requirements encountered in Sandia programs. As a result, Sandia research engineers and scientists have evolved special techniques for wrapping configurations and for calculating the various changes needed in the wrap pattern for more complex, compound shapes.

Al Skinrod, one of the principles involved in filament winding at Livermore Laboratory, summarized the Company's role in this way.

"Efforts at Sandia are aimed at developing production applications for use by AEC suppliers in producing parts needed in Sandia programs. Collaterally, we are developing basic knowledge and exploring the potential of filament winding. We are attempting to analyze data to improve analytical and manufacturing techniques." Al is a member of Advanced Development Division, which has the coordinating function for filament winding at Livermore Laboratory.

In industry, interest in filament winding has been limited mostly to specific applications in pressure vessels, such as rocket-motor containers, fuel containers, and cry-



COMPRESSION TEST OF FILAMENT-WOUND CYLINDER. This is a typical test setup for a cylinder wrapped at Livermore Laboratory. Specimens such as this are exposed to severe structural and environmental tests to determine suitability of the material for many applications. This cylinder had a wall thickness of 0.090 in., and the inside of the cylinder was reinforced with a honeycomb to prevent buckling. The cylinder ultimately failed under a compression load of about 25,000 psi. For comparison, the density of filament-wound structures is only about one-fourth that of structural steel, but the failure level is only about one-third. Therefore, the filament-wound structure has greater strength per unit of weight than structural steel.

ogenic vessels. There is even a project to produce a filament-wound hull for a submarine! Current studies at Livermore Laboratory are aimed at many applications, and subject filament wound structures to the full spectrum of compression, tension, bending, buckling, and shear loads. Application of Sandia-developed, filament-winding techniques to products throughout industry may be a study in itself.

Because of the comparative economy of low-quantity production, filament wound structures are used where frequent changes are anticipated or where fast results are necessary. A similar operation using metals tends to be expensive and requires considerably more time. Metals are highly desirable for large production runs, but plastics are becoming more desirable for the quantities used in Sandia programs.

The future of reinforced plastics has been compared with the "discovery" of aluminum more than 30 years ago. With the advancement of reinforced plastics, this material is destined to replace metals in countless applications; plastics may well expand into an industry greater than achieved by any other construction material.

FINISHED FILAMENT-WOUND STRUCTURE—This cylinder, checked by Mel Brown, Al Skinrod, and Larry Behrmann, is typical of structures produced in the filament-winding lab at SCLL. Mel and Al are "users" of the product in that they apply the filament-winding capability to specific programs. Larry was instrumental in the initial structural studies of the material, and George Dunbar (not shown) is responsible for techniques of wrapping and materials studies at Livermore Laboratory.



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FEBRUARY 26, 1965

HOLE-IN-ONE—Paul Montoya realized a golfer's dream Saturday, Jan. 30, when he shot a hole-in-one on the 155-yd. No. 7 green at Los Altos. Witnesses included H. H. Brueggemann, R. E. Henderson, and O. B. Tjeltweed. The foursome are members of Weapon Systems Development Department II.



# Supervisory Appointments



**SAMUEL McALEES** to supervisor of Advanced Weapon Aerodynamics Division, Aero- & Thermodynamics Department, effective Mar. 1.

Sam joined Sandia in February 1956 and has been with Aero- & Thermodynamics Department since that time. Just prior to coming to Sandia, he served 15 months in the Army.

He graduated from Rensselaer Polytechnic Institute with Bachelor's and Master's degrees in aeronautical engineering. Following graduation in 1953, he spent a year at the same school studying towards a PhD degree.

Sam is a member of Sigma Xi and the Scientific Research Society of America.



**JOHN E. MARION** to supervisor of Special Projects Division, Preliminary Design Department at Livermore Laboratory, effective Feb. 16.

John joined Sandia at Livermore Laboratory in June 1958 and was assigned to a project group. He has worked in preliminary analysis and field test.

Before coming to Sandia, John served three years in the Marine Corps.

John received his BS degree in general engineering from the University of California at Los Angeles in 1954. He was awarded his MS degree in mechanical engineering a year later from the same school.

He is member of the California Society of Professional Engineers.



**V. KEITH SMITH** to supervisor of Instrumentation Design Division, Upper Atmosphere Projects Department, effective Mar. 1.

Keith has been with Sandia almost nine years and has worked most of that time in the Field Test Organization. From 1959-61 he worked at Cape Kennedy, Fla.

He graduated from the University of Idaho in 1956 with a BS degree in electrical engineering. Keith belongs to Sigma Tau, honorary society, and the Institute of Electrical and Electronics Engineers.



**WILLIAM R. BARTON** to supervisor of Rocket & Recovery Systems Division, Aero- & Thermodynamics Department, effective Mar. 1.

Bill has been with Sandia since June 1952 and, with the exception of the first six months spent in an engineering department, he has worked in Aero- & Thermodynamics Department.

Immediately before coming to Sandia he was a student at West Virginia University and was graduated with a BS degree in aeronautical engineering. At the University of New Mexico, Bill has completed most of his graduate courses toward a Master's degree.

He spent two years in the Army and in 1952 was commissioned in the Air Force Reserve and now holds the rank of Captain.



**E. P. QUIGLEY** to supervisor of Advanced Manufacturing Process Development Division, Advanced Manufacturing Development Department, effective Feb. 16.

In the 11 years "Pat" has been at Sandia, he has worked mostly in manufacturing engineering. He has also worked in production control and MD procedures and more recently in Advanced Manufacturing Development organization.

Before joining Sandia, Pat worked for 11 years for the General Electric Co., in Cleveland, O. He was production supervisor in the filament coiling department and later design engineer on filament lamps. During this period he also served three years in the Army.

He was graduated from Case Institute of Technology with a BS degree in mechanical engineering. He is a registered professional engineer in both New Mexico and Ohio.



**GABRIEL GU- TIERREZ** to supervisor of Communications Center Section at Livermore Laboratory, effective Feb. 16.

Gabe has been at Livermore since February 1960. During this period he has worked almost exclusively in communications, and before his promotion was senior clerk of the communications center.

Before joining Sandia, Gabe served four years in the U. S. Air Force. While in the service he attended Communications Specialist School. He also attended evening classes at the University of Maryland for a year.

Gabe is presently attending San Joaquin Delta College, majoring in business administration. He has completed three cryptographic courses: two sponsored by GSA/AEC Headquarters, Washington D.C., in 1962; and one offered by the West Coast Relay and Radio Transmitting Station, USA Strategic Communications Command (CONUS) at Davis, Calif., last February.



**JOSEPH A. GREGORY** to supervisor of Field Services Division, Field Force Department, effective Feb. 16.

Joe has worked in Field Force Department since he was hired by Sandia 13 years ago.

Previously he was a civilian electronics instructor for two and a half years at Keesler AFB.

Joe was graduated from Louisiana Polytechnic Institute with a BS degree in electrical engineering. He is a registered professional engineer in New Mexico.

Prior to college, he served four years in the Air Force.



**JOHN D. PATRICK, JR.**, to supervisor of Instrumentation Division, Planning & Functional Test Department, effective Feb. 16.

John joined Sandia in January 1959 and has worked in the Instrumentation Organization since that time. Before coming to Sandia, he worked seven years as an instrumentation engineer—five years at White Sands Proving Grounds and two years for International Minerals and Chemical Corp. at Carlsbad, N. Mex.

He received a BS degree in electrical engineering from the University of California at Los Angeles.

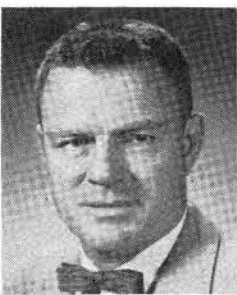
He is a member of the Instrument Society of America.



**JAMES C. GRAVLIN** to supervisor of Administrative Assistant Division (2000), Technical Information and Publications Organization, effective Feb. 16.

Jim came to Sandia in October 1949 and spent five years in production control work. Following that he worked as an administrative assistant for several organizations and in September 1960 became administrative assistant to the Director of Physical Research.

Jim was graduated from the University of New Mexico in 1949 with a Bachelor's degree in business administration. During World War II, he served three years in the Army Corps of Engineers.



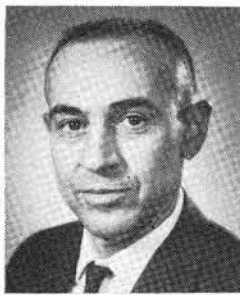
**JAMES M. de MONTMOLLIN** to supervisor of Test Design and Evaluation Division, Systems Evaluation Department, effective Feb. 16.

Jim was hired by Sandia Corporation in October 1953. He has worked in the Systems Department, headed a project group, and since November 1962 has been in the Advanced Systems Organization.

Before he came to Sandia, he worked for a manufacturing plant in Georgia for five years, doing electro-mechanical design.

He attended Georgia Institute of Technology and graduated with a BS degree in electrical engineering. He is a registered professional engineer in New Mexico.

Jim served three years in the Army during World War II and was recalled during the Korean conflict for service in the Signal Corps during 1951-52.



**EDWARD C. RIGHTLEY** to supervisor of Mechanics and Mathematics Division, Aero- & Thermodynamics Department, effective Feb. 16.

While on the faculty at the University of New Mexico, he served as a consultant to Sandia. Before coming to Sandia in 1958 he was with UNM for 11 years, teaching in the Mechanical Engineering Department.

Ed holds a Bachelor's degree from the University of New Mexico and a Master's degree from the University of Colorado in mechanical engineering. He served in the Navy during World War II.

He is a registered professional engineer in New Mexico and is a member of Pi Tau Sigma, honorary society, and the American Institute of Aeronautics and Astronautics.

## Congratulations

Mr. and Mrs. Antonio L. Saavedra (4254), a son, Rafael M., Jan. 12.

Mr. and Mrs. Edward G. Paboucek (2213), a daughter, Renee Alana, Jan. 12.

Mr. and Mrs. Harold A. Bennett (5520), a daughter, Barbara Jean, Jan. 12.

Mr. and Mrs. Wilson M. Payne (7325), a son, Scott Murry, Jan. 24.

Mr. and Mrs. Daryl L. Anderson (1432), a daughter, Kelly Suzanne, Jan. 25.

Mr. and Mrs. E. W. Roberts (2212), a son, Bryan Dale, Jan. 27.

Mr. and Mrs. James M. Fisher (4114), a son, Bryan Arnold, Jan. 29.

Mr. and Mrs. David R. Schafer (7214), a son, Christopher John, Feb. 4.

Mr. and Mrs. A. V. Luhrs (2562), a son, Christopher Alden, Feb. 9.

Mr. and Mrs. L. D. Wright (7252), a daughter, Polly Louise, Feb. 5.

Mr. and Mrs. W. D. Stoppkotte (1424), a daughter, Suzanne Gretchen, Feb. 9.

Mr. and Mrs. Donald M. Carlton (1111), a daughter, Monica Elaine, Feb. 9.

Mr. and Mrs. D. A. Dahlgren (5234), a daughter, Stephanie Kay, Feb. 10.

Mr. and Mrs. James Renken (5231), a son, John David, Feb. 12.

Mr. and Mrs. Richard P. Guilford (1313), a son, John Richard, Feb. 3.

Mr. and Mrs. Robert C. Holt (9211), a son, Kevin Lee, Feb. 7.

## Sympathy

To Jerry Ramsey (2563) for the death of his infant son, Robert, on Jan. 23.

To W. O. McCord (4632) for the death of his wife on Feb. 16.

## R. N. Browne Presents New Mexico Flag to Tonopah Businessmen

Tonopah, Nev., is on its way to becoming "the flag capitol of Nevada." R. N. Browne, supervisor of Sandia's Tonopah Range Operations Division, recently presented a flag of New Mexico to the Tonopah Chamber of Commerce. This flag, along with flags of other states, will be part of a tourist welcome to Tonopah in observance of the 100th year of statehood for Nevada.

Mr. Browne gave the flag to Hal Palenske, president of the Tonopah Chamber of Commerce, at a recent meeting of the group. Mr. Palenske explained that the flags now being collected will be flown along Tonopah's main street so that tourists driving through the business district may see the flags of their own states.

Also attending the meeting where the presentation took place was Harley Moody of the Optical Measurements Section at Tonopah Test Range.

R. N. BROWNE, supervisor of Tonopah Range Operations Division, recently presented a New Mexico flag to the Tonopah Chamber of Commerce. Standing with Mr. Browne are Phil Evans and Hal Palenske, officers of the Chamber of Commerce.

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LAB NEWS

FEBRUARY 26, 1965





# Planters Help Spruce-up Sandia Office Areas



AFRICAN VIOLETS don't need a lot of care, but it takes a certain "know how" to grow them. Elinor Coberly of Personnel Processing & Reports Division has this "know how" and the results can be seen in some of the Personnel offices in Bldg. 832.

House plants seem to have outgrown that sunny kitchen window. It's a common and pleasant sight to enter some Sandia Corporation offices and have your eye caught by bright green, interesting looking plants.



NAOMI KELLY also brought these plants from her own home to accent the newly-painted offices of Procurement & Local Services Division in Bldg. 802. In one of the offices she has selected a wide sunny window sill where she thinks geraniums will grow.

Many of these employees who seem to have such a "green thumb" attribute their success to artificial lighting. Researchers in the florist and commercial growing business agree that sunlight and white light from ordinary fluorescent lamps both do the job of photosynthesis—the process of using the energy of light to convert carbon dioxide, water, and minerals into leaves, seed, and fruit.

Whatever the reason, employees do seem to have good luck with different plants. One word of warning: Don't try to be helpful by watering a plant unless you have been asked to—you might have some explaining to do to an irate grower!

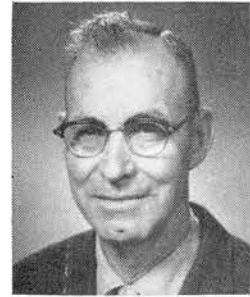


EVIDENCE OF Lora Duben's "green thumb" is scattered throughout Bldg. 805. Lora is secretary to the three Department Managers in Materials & Process Development Organization. She and her husband, Wence of Special Device Test Division, have a greenhouse at home, which supplies many "starter plants" for friends and co-workers.



JUDY MERSHON waters one of the plants in the office of Don Lundergan, supervisor of Materials & Process Engineering Division. The plants are potted separately and placed in the planter along the window.

## M. M. Peeples to Retire from Sandia End of February



M. M. Peeples, a Sandia employee for more than 14 years, will retire the end of February.

Mr. Peeples has been in charge of grounds maintenance for the past eight years and is responsible for the landscaping around many of the Sandia Laboratory buildings.

Several years ago he purchased a house in Ontario, Calif., (at 1048 N. Laurel) and he and his wife will move there after his retirement. "I've always wanted to try growing bananas, avocados, and poinsettias. Now I'll have my chance," he explained.

In addition to yard work, household repairs, and his hobbies of landscaping and gardening, Mr. Peeples has a new camp trailer waiting for him in Ontario for fishing trips to the north and northwest.

The couple has a son here and three children in California.

## Formal Dress For Coronado Club Dinner Dance

A formal ball, patterned after one of the elegant Mardi Gras events in New Orleans, will be held at the Coronado Club tomorrow night.

A black and white theme will be carried out in the decorations. The admission price will include a filet mignon dinner served from 6:30 to 8:30 p. m. Jack Shearing's orchestra will play for dancing from 9 p. m. to 1 a. m.

Reservations should be made at the club office.

## Sandia Authors

C. J. McGarr, Director of Service Operations, "What Is Management Control?" February issue, **Management**, publication of National Management Association.

V. O. Henning, Employment Division, "Technicians in Research, Development, and Testing," March issue, **Technical Education News**.

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LAB NEWS

FEBRUARY 26, 1965

### SHOPPING CENTER

### SHOPPING CENTER

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#### 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

- 4 TIRES, 1st line 6.25 x 14, original equipment, brand new; getting premium tires for new car, available about Mar. 15, \$60. Caskey, 256-9701.
- ALL BRICK, 4-bdr., den, 3 yrs. old, \$2000 down, \$26,500, 2801 San Pablo NE. Roth, 298-3668.
- MAPLE BEDROOM SET, double bed, dresser, mirror, chest, \$50. Binder, 299-2937.
- NEW CUBICAL QUAD ANTENNA 10-15-20 meters, made by Cubex Corp., \$75. Halliday, 255-3912 or 255-9862.
- 21" TV, late model, w/new picture tube, blond thin-line cabinet, \$65. Sayers, 344-8597.
- VW TRAILER HITCH, \$5; 4 used 5.20 x 13 w/w tires, \$10. Stang, 299-5139 after 5.
- USED ENLARGER, Federal 312, 3 developing trays 10" x 12", mask 13" x 16", and electronic timer, \$20 for lot. Roberts, 255-9527.
- '62 PONTIAC sta. wagon, factory air, radio, luggage rack, 17,500 miles, below NADA list. Vinson, 255-6962.
- HOUSE IN SOUTH VALLEY, 3 bdr., den, bath & 3/4, fireplace, 1/2 acre, apple orchard. Bryan, 877-0177.
- '63 CADILLAC Coupe De Ville, all power, AC, crux-o-matic, one owner, \$3750. Boyden, 268-8767.
- FULL SIZE MATTRESS and box spring set, medium firm, Sealy Park Lane, \$35, 3391 51st Loop. Schaechter, 264-7221.

- KENMORE WASHER DRYER combination, \$65; Kenmore vacuum sweeper, \$10; TV console, \$50; window or roll-around air cooler, \$10. Johnson, 255-0262.
- GERMAN LUGER 9mm pistol, \$75; antique wood vase, \$2.50; many antique crocheted items; will trade. Smith, 299-1096.
- 3-PIECE SECTIONAL SOFA, large, modern, brown-tan tweed w/silver thread, nylon frieze, plastic polyfoam cushions w/zipped covers, cost \$659, sell \$195. Hurt, 282-3675.
- '55 "210" CHEVROLET, R&H, standard shift, 4-dr. sedan, Jarvies, 299-4387.
- DORMEYER MIXER, large; Electrolux vacuum cleaner w/attachments; Wurlitzer, ebony, upright modern piano. Ruff, 268-9122, 9 a.m.-5 p.m.
- 1934 FORD 3-window coupe, \$575; transmission '49 Olds, stick, \$25. Koehler, 299-6533.
- STEREO CARTRIDGE, Empire 880 PE, elliptical diamond stylus, response 8-30,000 cps, \$17. Steinmetz, 268-5812.
- '56 MGA 1500 Series convertible, \$450 or best offer. Davis, 298-8559.
- STUDIO COUCH, makes into double bed, \$30. Jones, 255-7924.
- MATTRESS AND BOX SPRINGS on legs, \$15; full size baby crib w/mattress, \$15. Minser, 3308 Belts Dr. NE, 299-1364.
- '51 DE SOTO, 8-passenger, 33,500 miles, \$550. Corll, 255-5683.
- GREY DINETTE, 4 chairs; window air conditioner; 5-drawer chest, needs painting. Jackson, 268-9571 after 5.
- HALLICRAFTER'S SX62A, general coverage receiver including FM, \$250, will consider trade for calves, horse, or photographic equipment. Ross, 867-2413.
- COLT 44 and 45 Frontier, \$55 each; Winchester .22 pump, will trade, want hand guns, any cal. Zaluga, 344-1564.
- GAS FURNACE, central heating, 12 years old. Dobias, 256-7476.
- MUSIC STAND, folding, \$3. Rettinger, 256-1552 after 5:30.
- '53 CHRYSLER 4-dr. New Yorker, PS, PB, R&H. Garcia, 256-6292.
- '49 CHEVROLET 4-dr., '65 license, \$100. Caster, 299-1239.

- THREE HAYWOOD-WAKEFIELD TABLES w/matching bookcase, \$50; chair w/ottoman, \$25. Adams, 256-7334.
- '55 CHEVY 4-dr., stick shift, R&H, recently overhauled, \$400 or best offer. Salazar, 255-1301.
- 30" APARTMENT SIZE electric range, \$60, Westinghouse 1960 Embassy model, will deliver. Mecklenburg, 344-6793.
- CUSTOM BRICK 3-bdr., 2 baths, electric kitchen, den, fireplace, double garage, basement, Ashcraft area, 1000 Mesilla NE, \$2000 down or trade. Smith, 255-6478.
- TWO END TABLES, coffee table, \$10; Hide-away bed, innerspring mattress, \$20; 30" x 40" movie screen, \$5; RCA-45 record player. Houghton, 299-3386.
- CORRALES 3-bdr. Pueblo style, carpeted, beam ceilings, 3 fireplaces, double garage, corral, 1 acre, independent apt. w/kitchenette, bath, fireplace. Swiss, 898-2083.
- WHITE naugahyde recliner chair. Hunnicutt, 299-2932.
- FRIGIDAIRE REFRIGERATOR, 11.4 cu. ft., \$50 or best offer. Thayer, 299-3127.
- SHOPSMITH MARK 5, \$150, also numerous accessories: jointer, bandsaw, dado-cutter, molding head, lathe tools, etc. at one-half list price. Allen, 243-7085.
- AIRCRAFT LFR-2 low frequency and broadcast band receiver; sportscar heater; will trade. Laskar, 299-1024.
- RECLINER CHAIR, brown and tan, \$15; size 16 boy's charcoal grey Stromberg suit, used one season, \$10. Duvall, 299-8744.
- SHOPSMITH w/extra blades, dado, lathe chisels, molding-head cutters, hold downs, \$225. Johnson, 299-8891.
- GUITAR AMPLIFIER, 80-watt dual 12" speakers; electric guitar, both for \$65. Gallo, 298-8572.
- ENCYCLOPEDIA AMERICANA, 30-volume set, including bookcase, 1952 edition. Miller, 255-7716.
- MAPLE TWIN BEDS: headboards, footboards, steel sideboards, \$40; adjustable load-leveling trailer hitch, \$14; registered 3/4 Arabian colt. Galbreath, 898-0644.
- 3-BDR., 1 1/4 bath, half acre North Valley, city utilities, irrig. well, fenced, fruit trees, pitched roof. Reid, 344-0521.
- USED TIRES: 3 Goodyear nylon Suburbanite snow tires, some tread 7.60x15. Stevens 299-6086

- 23" MOTOROLA TV set, table model, \$10 or trade for used chest-of-drawers. Gonzales, 243-5283.
- TWIN HOLLYWOOD BEDS, Simmons mattresses, head boards, \$50 complete; baby bed w/mattress. Smith, 299-8133.
- .22 AUTOMATIC RIFLE, Marlin, best offer. Dunn, 255-9215.
- FRIGIDAIRE REFRIGERATOR and Westinghouse washer, both for \$60. Miller, 298-0249 after 5:30.
- 69-KEY CHORD ORGAN, 2 keyboards, electrically amplified, 8" speaker, 6 mos. old, orig. cost, \$258.90, sell \$145. Neiman, 298-0889.
- LARGE 3-bdr., 1 1/4 baths, den, dbl. garage, 1700 sq. ft., \$3500 cash to loan. Watkins, 298-3667.
- SHARE in '60 Cessna 172. Sigma aircraft club; comfortable, economical, fully-equipped airplane, \$1500. May, 299-5548.
- GREASE GUN and cartridges; FM tuner w/matching 18-watt amplifier, monophonic, 8" 4 x 4's; VROOM motor. Berger, 298-4234.
- REFRIGERATOR, Monitor, 9 cu. ft., \$30. Bertrand, 268-4191.
- 3-BDR., den, fireplace, 1 1/4 baths, attached garage, 1475 sq. ft., walk to schools, movie, bowling, shopping. Yards landscaped, fenced, \$16,000. Post, 298-0481.
- SKI BOOTS, men's size 9 1/2. \$5. Begeal, 255-2244.
- FIGURE SKATES, girl's size 13, \$5; student xylophone. Siegrist, 299-3088.
- '53 INTL. TRAVELALL, 4-speed trans., spare tank, snow tires, 6 rims, new paint, \$450. Gubbels, 299-8089.
- 3 RABBITS, pets, and hutch, will trade for chickens or hamsters. McVeety, 299-5718.
- '59 PONTIAC, 4-dr. Vista, below NADA. Sandlin, 299-8786 after 5:30.
- '63 PONTIAC CATALINA 2-dr. sport sedan, 15,000 miles, extras, factory air, priced under book, original owner. Browning, 299-6384.
- FOUR-PIECE SECTIONAL davenport, turquoise, Kroyler made, \$75; one coffee table and two end tables, limed oak, \$15. Fortman, 256-2105.
- BABY STROLLER w/replacement parts; set ladies golf clubs. Braudaway, 298-2486.
- UNIQUE CHERRY corner cupboard, \$100. Flower, 255-1827.

- '62 MERCURY Meteor Sedan, V-8, PB, PS, deluxe interior, \$1350. Ramshaw, 256-3176.
- 2-BDR. HOUSE, NE, landscaped, large patio, ten minutes from Bases. Davis, 299-0472.
- EXTRA LARGE Glenwood Hills lot w/view of city and crest, priced below estimated value. Carlton, 299-6041.
- BANTAM CHICKENS, 75c; horse, \$125; Roper gas range, \$30; Remington standard typewriter, \$35; Servel gas refrigerator, \$30. Shock, 877-3728.

#### WANTED

- CUB SCOUT PACK 181 would like to obtain used Cub Scout uniforms in good condition. Cobb, 299-1995.
- SKIS, pairs or singles any condition, and other discarded snow equipment for use by underprivileged children. Jolly, 877-2474.
- OWNER OF A-35 Bonanza wants to form partnership with one or two licensed pilots, can finance if necessary. Hart, 299-0669.
- BARBELLS, reasonable. Johnson, 255-5427.
- SKIS, bindings, poles, boots for children age 6, 9, 11, also men's ski equip. and size 10-11 boots. Illing, 299-7378.
- TRADE .38-40 and .45 reloading dies for .357 or .30-06 reloading dies. Flowers, 282-3458.

#### FOR RENT

- DELUXE 1-bdr. furnished apt., 1 1/2 yrs. old, electric kitchen, carpeted, automatic heat, a/c, storage, \$95, 10104 Comanche Rd. NE. Stone, 298-4620.
- 2-BDR. HOUSE, near base, stove and refrigerator furnished, \$90/mo., 614 Valencia SE. Becker, 255-8497.
- UNFURNISHED new 3-bdr. Bronze Medallion house, den, fireplace, carpeted, a/c, 3 baths, 1/2 acre, fenced, corral, tack room, horses permitted, Trail Acres. Roberts, 344-3780.

#### LOST AND FOUND

- LOST—Man's black glove, earring w/4 green stones, men's sunglasses, silver chain w/silver medallion, lady's sunglasses, Air Force topcoat, red serape, pr. black nylon gloves. LOST AND FOUND, tel. 264-2757.
- FOUND—GM key, lady's white glove, rose knitting needle-size 3, tow chain, pr. men's black gloves, Zippo lighter. LOST AND FOUND tel. 264-2757.





BOTH U.S. and Canadian patents have now been issued the AEC for this coupling device invented by R. O. Work.



BLAST YIELD METER, shown with two of the inventors Maynard Cowan (left) and Howard Sander, has been patented in six foreign countries.

## Foreign Patents Issued on Inventions By Sandia Laboratory Scientists

U. S. patents on items invented by Sandia Corporation employees are periodically granted the Atomic Energy Commission. This winter there has been official notification of the issuance of foreign patents.

Sandia's Patent Manager Robert M. Betz has been informed by Dudley W. King, Patent Attorney, AEC/ALO, that foreign patents have been granted three inventions originated at Sandia Laboratory.

A blast yield meter, invented by H. H. Sander of Materials and Device Physics Division, Maynard Cowan, Jr. of Magneto Physics Research Division, and Stuart C. Hight, former Director of Research, received the widest interest. The device has been patented in Great Britain, Canada, Belgium, Germany, Sweden, and Japan.

A Canadian patent has been assigned to the AEC for a bayonette-type coupling with pivoted segment release means. The inventor was R. O. Work of Electronic Components Division.

Patents on a cable connector, invented by J. M. Caller, also of Electronic Components Division, have been granted by Great Britain, Canada, and France.

Rights conferred by a U. S. patent extend through the United States, its territories and possessions for a period of 17 years from the date the patent is granted. Foreign patents must be obtained from each different country as there is no such thing as an "international patent."

There are a number of treaties concerned with patents, the most important being the International Convention for the Protection of Industrial Property. This has been revised a number of times since first signed in Paris in 1883 and now includes more than 50 countries (even Hungary, Czechoslovakia, Cuba, Poland, Viet Nam, and Yugoslavia). The USSR is not a party to any international agreement although it has special bilateral treaties with certain individual countries.

A basic article of the International Convention is that nationals of each member country have, with respect to patent rights, the same advantages in other (member) countries as are given by those countries to their own nationals.

The "right of priority" is another important feature. It allows the inventor to take advantage of his earliest filing date when applying for a patent for the same invention in one of the other countries within 12 months. (Otherwise, in most countries, publication of invention before applying for a patent defeats the right to a patent.) This is one reason why it is sometimes requested that publication of a Sandia invention be temporarily withheld until a U. S. patent application is filed.

Practically every country in the world has a patent law and in certain respects they are similar; however, there are variations in subject matter patentable, conditions for patenting, requirements and procedures, and length of time the exclusive patent right lasts. In Paraguay a patent is in effect 15 years from the date of the application; in Great Britain, 16 years; and in Belgium, 20 years.

So, if you're thinking of manufacturing for sale a "Vorrichtung zum Messen der Starke einer Explosion" in Germany, or an "Apparat for att mata energiut-veckling vid explosioner" in Sweden, or a "Blast Yield Meter" in the United States, don't do it without permission! Anyway, it's already patented.



THREE FOREIGN countries have issued patents on this Cable Connector, invented by J. M. Caller.

## AEC Contractor Classification People Meet at Sandia Laboratory

Classification representatives from 12 AEC integrated contractors met at Sandia Laboratory Feb. 16-18. This was the seventh meeting of the Weapon Contractors Classification Conference. Donald B. Woodridge, Y-12 Division, Union Carbide Corporation, chairman of the Conference, presided over the meetings.

J. G. Marsh, supervisor of Sandia's Classification Division, points out the meetings are necessary because newer systems involve many more agencies than formerly—this gives rise to new and additional classification problems.



## Industrial Engineers to Present 'Cost Optimization' Conference

A roster of outstanding speakers will be presented during the "Cost Optimization" Conference Mar. 19 sponsored by the New Mexico Area Chapter of the American Institute of Industrial Engineers. Al Kaping of Purchasing Administration Division is program chairman.

Banquet speaker will be James E. Webb, Administrator, National Aeronautics and Space Administration (NASA). The banquet will begin at 6:30 p.m. at the Holiday Inn.

Mr. Webb has directed NASA since 1961. He is a member of the Federal Council for Science and Technology, the President's Committee on Equal Opportunity, the National Aeronautics and Space Council, and is chairman of the Distinguished Civilian Service Awards Board.

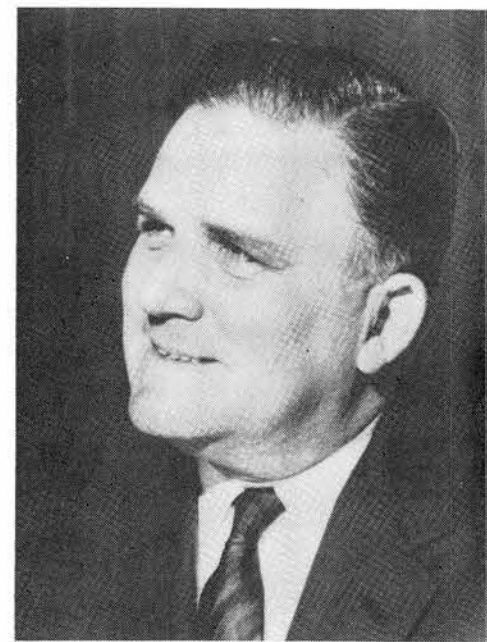
An attorney and businessman, Mr. Webb has served in high government and industry positions. He has been active in aviation and education. He is a former Director of the Bureau of the Budget and a former Under-Secretary of State. He has been a vice president of the Sperry Gyroscope Co., chairman of the board of directors of Republic Supply Company, a director of Kerr-McGee Oil Industries, Inc., and a director of McDonnell Aircraft Co.

Conference luncheon speaker will be S. P. Schwartz, Sandia Corporation President. The luncheon will be held at noon at the New Mexico Union Bldg., University of New Mexico. Mr. Schwartz will discuss "Industrial Engineering at an R&D Laboratory."

Sessions of the conference will be conducted concurrently in the New Mexico Union with registration beginning at 8 a.m.

Session speakers will include L. S. Frantz, Director of Manufacturing, Carter Carburetor Division, ACF Industries, St. Louis, Mo., "Planning for Profit"; Glen D. Hart, Manager, Value Engineering, Aerojet General Corporation, Azusa, Calif., "Value Engineering and Your Individual Contribution"; W. R. Nellin, Director of Industrial Engineering, United Airlines, Chicago, Ill., "Payoff Through Industrial Engineering in United Airlines."

Other session speakers will be Harold L. Enarson, Academic Vice President, University of New Mexico; D. W. Reeves, President, Public Service Co. of New Mexico, "The Contribution of the New Technology



James E. Webb

to Utility Economics"; William G. McMurry, Manager, Value Control, Military Electronics Division, Motorola, Inc. Scottsdale, Ariz., "Application of Value Engineering"; John J. Rogers, Vice President, Region X, AIIE, and Plant Engineer of Navigation Systems Division, Autonetics, North American Aviation, Anaheim, Calif., "The Changing Concept of Industrial Engineering"; and Scott T. Poage, Head, Department of Industrial Engineering, Arlington State College, Arlington, Tex., "Analytical Methods of Today and Tomorrow."

It will not be necessary to register for the technical sessions in order to attend the Conference luncheon or banquet, according to Mr. Kaping. However, reservations should be made with Lee Toliver of Operations Planning and Quality Control Division, registration chairman, tel. 264-5709.

Conference chairman is Don Arquette of Electronic Development Division. President of the New Mexico Area Chapter of AIIE is Jerry Ramsey of Value Engineering and Cost Reduction Division.

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LAB NEWS

FEBRUARY 26, 1965

## Sandia's Safety Scoreboard

**Sandia Laboratory:**

14 DAYS  
490,000 MAN HOURS  
WITHOUT A  
DISABLING INJURY

**Livermore Laboratory:**

188 DAYS  
952,500 MAN HOURS  
WITHOUT A  
DISABLING INJURY