

GENERAL LAYOUT OF UNDERGROUND USO installation is shown in this artist's conception. The seismometer package is located at the bottom of the borehole. Electronic systems and timing devices are housed in the small shelter just below the surface. Tank on the right contains propane, the fuel source for the thermoelectric power unit.

# USO Units Are Operating Successfully

Unattended Seismological Observatory (USO) units, developed by Sandia at the request of the Advanced Research Projects Agency (ARPA) of the Dept. of Defense, are operating successfully in desert and permafrost environments as they enter the second half of a one-year evaluation period.

Designed for the Advanced Research Projects Agency as an aid in detecting, locating and identifying seismic events, the USO units operate unattended for 120 days with sufficient accuracy to permit correlation of recorded seismic waves (earth motion) within one-tenth second of world time.

Seismic Systems Division 9233 installed one unit near Fairbanks, Alaska, in May 1966; another near Vernal, Utah, a year ago; and the third in a Manzano Mountain site near Coyote Test Field last September. The local site was selected for convenience in monitoring, modifying and testing the USO unit. The others were selected to evaluate USO performance in permafrost and desert environments.

Some modifications were made to the USO units between the installation dates and the start of the evaluation period in February. The slow-speed tape recorder, for

example, developed bearing trouble. It was redesigned to correct the mechanical problem and the recording head was also modified.

Since the early modifications, the units have operated successfully in both environments. The one in Alaska has been subjected to average interior temperatures of 6 to 32 degrees F. Temperatures inside the USO in Utah have ranged from about 25 to 80 degrees F.

The observatory's major components are a seismometer package with three short-period (one second) seismometers and three long-period (15 seconds) seismometers enclosed in a nine-foot-long metal cylinder; a timing system with a crystal-controlled time base; a slow-speed (0.015 inch per second) magnetic tape recorder; a propane-fueled thermoelectric generator for power supply; and associated electronic systems.

The magnetic tape recorder continuously records signals from the three short-period seismometers, three long-period seismometers and two timing channels for 120-day periods. The data are recorded simul-

taneously in 14 data tracks of the one-inch wide polyester tape.

At the end of a 90-110-day period, Division 9233 personnel compare the USO's one-second pulses with a portable master clock, which is kept within five milliseconds of Greenwich Mean (world) Time, and the difference is noted for use in making any necessary time corrections.

After every 90 to 110 days of unattended operation, two or three members of Division 9233 service the observatories. In addition to checking systems and timing devices, they replace the magnetic tape containing recorded data with a fresh reel. The USO tapes are played back at Sandia for re-recording in another format. Reformatted tapes are then sent to Vela Seismic Data Center in Virginia for analysis.

ARPA authorized Sandia to design, build, test and evaluate the USO units. R. S. Reynolds is USO project leader reporting to H. M. Dumas. Other members of the project group are D. E. Gladow, P. A. Fjelseth, E. R. Stepka, D. F. Davis, E. D. Zaffery, V. W. Hansen, J. K. Linn and G. H. Mauth (all 9233).



## SANDIA LAB NEWS

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SANDIA LABORATORIES

ALBUQUERQUE, NEW MEXICO; LIVERMORE, CALIFORNIA

OPERATED BY SANDIA CORPORATION FOR THE U. S. ATOMIC ENERGY COMMISSION

### Early Detection is Critical

## Everyone Please Take Diabetes Test Urges Primo Romero, a Diabetic

Sandia's Medical organization is currently offering employees the opportunity to participate in a diabetes detection program. The employee is notified by Medical to report to a Company medical station at his earliest convenient time. The test takes only a few minutes and is entirely voluntary.

Diabetes is an insidious disease. You can have it and not know it. It could cost you a leg or your vision. Even death. Ask A. M. (Primo) Romero, an inspector in Mechanical Measurements Section 4213-3.

Primo first learned that he had diabetes when he underwent a routine physical examination at Sandia in 1958. At that time he felt "pretty good" and had no suspicion of a serious disease.

It was some time after Sandia's Medical organization diagnosed his illness, before he started treatment — some medication and a sugarless diet — with his own doctor. He had no serious problems until two years later when he spent an active day breaking in a pair of new boots. That night he noticed some bruises on the toes of his left foot and felt numbness. The numbness continued and Primo went into the hospital for 42 days. Circulation was regenerated in the foot without surgery.

"My delay in not starting treatment promptly, allowed the disease to reach critical stages," Primo says.

After the first serious problem, Primo went on a very strict diet—2000 calories per day—and started his daily insulin injections.

About a year later, during a cold November, he noticed that his right foot remained cold almost all the time. Numbness in the foot set in. He went back to the hospital. The foot did not respond to treatment. An artificial artery was inserted in an effort to start circulation. This surgery failed. On Nov. 21, 1963, his right leg was amputated just below the knee.

"I woke up and learned that President Kennedy had been shot," Primo says. "Did I feel terrible!"

It was a long, hard road back to learn to walk with an artificial limb. "The therapists wouldn't let me feel sorry for myself," Primo says. "I wanted to quit a number of times. Using the new leg just hurt too much. But they made me keep going. Finally, I got used to it. I could

climb stairs, move around as before."

Primo returned to work in March 1964 and felt "pretty good" again for a couple of years. He added two rooms to the house that he'd built in 1947. With some help from his oldest son, Primo did most of the work himself.

In January, diabetes flared again. This time it caused hemorrhages behind the retinas of his eyes. He couldn't see. Treatment followed with more medication and his vision returned—for awhile. In June, more hemorrhages, and just last week, he underwent eye surgery.

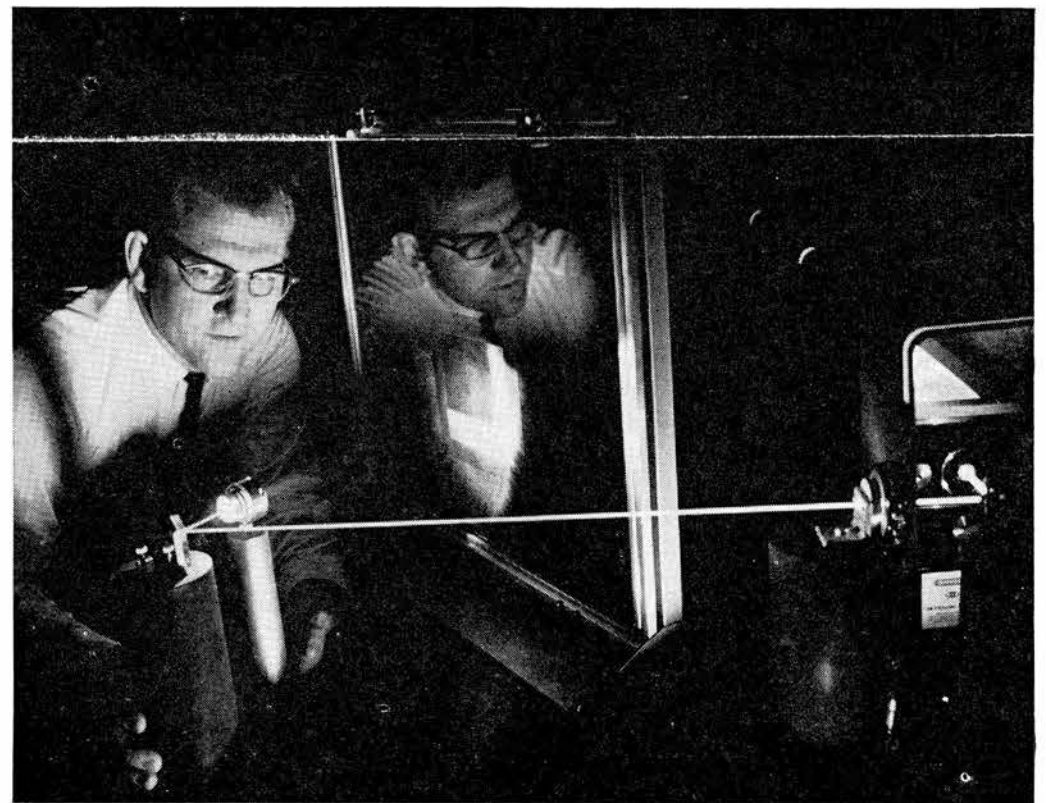
The surgeon used a photo-coagulation unit powered by a vacuum xenon arc for the surgery. The coagulator focuses a bright, hot beam of light on the retina to destroy tiny areas of potential bleeding. It is a "last resort" treatment and used only on severe cases.

Primo has recovered his vision. He's back at work. He feels "pretty good."

He urges all employees to take the diabetes test. Early detection and treatment can prevent the serious consequences that Primo has suffered.



PRIMO ROMERO, recovered from recent eye surgery, is back on the job in Mechanical Measurements Section 4213-3. Diabetes has given him serious health problems during the past 10 years.



COPYING A HOLOGRAM requires orienting a laser beam to the same angle as the intense light beam used in making the original hologram. Murphy Landry (7226) is directing a laser beam to a hologram and copy plate contained in a vacuum holder.

## Holograms Are a New Research Tool, Lasers Make Possible 3-D Copies

Anyone who has seen a laser-created hologram will describe its three-dimensional effect as "amazing." However, a photographer might term both the visual effects and technical problems as "weird."

(A hologram is a photographic plate on which an image has been recorded by laser beam. When the plate is illuminated by laser light, the image appears in a full three dimensions.)

There are several features of holograms that tend to disturb photographers: the image is recorded on film without a lens; the film can be cut into tiny fragments — each of which will contain the complete image; and the reconstructed image is three-dimensional, having all the visual properties of the original scene, including density and changes in depth and proportion from different angles.

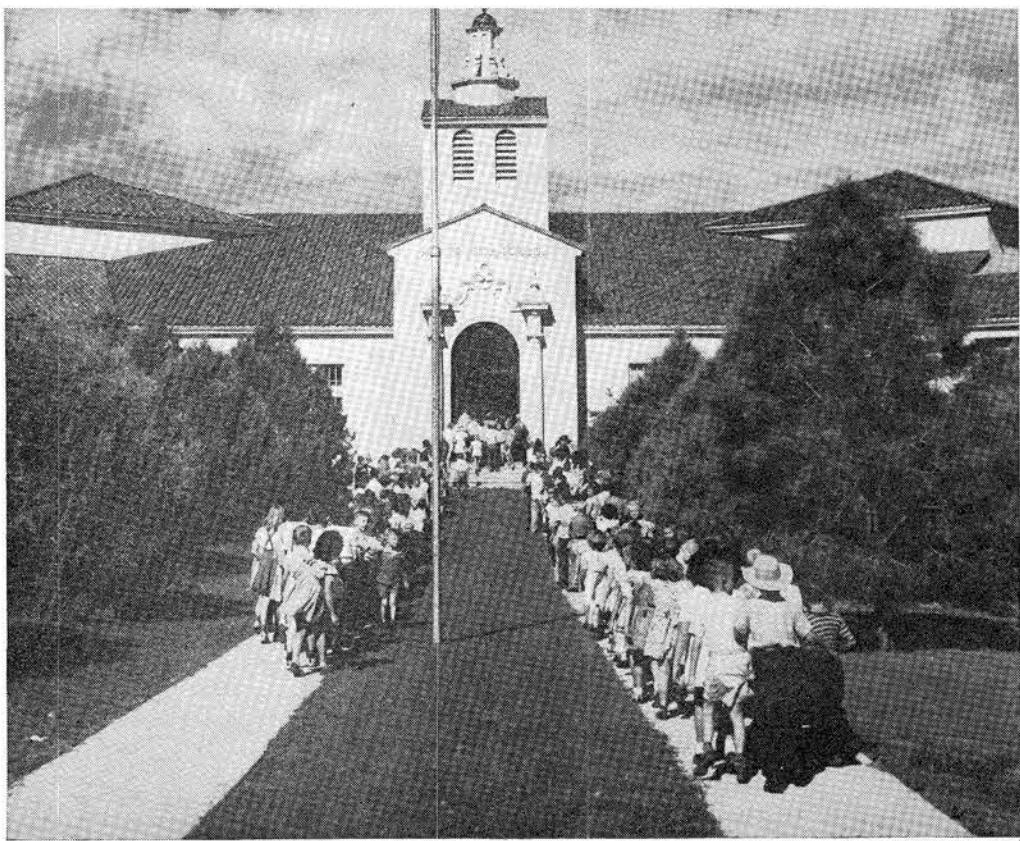
The field is new, the problems are many, the probable applications are vast.

Murphy J. Landry (7226) became interested in lasers when he was in graduate school in the early 1960's at New Mexico State University (his doctoral dissertation was "Fabry-Perot Type Mode in Ruby Lasers." Since coming to Sandia Laboratory three years ago he has worked in laser applications, first in Special Project's Electro-Optics Division 9232 and more recently in Field Testing's Photometrics Division 7226.

Holograms and how to copy them have been among these applications and last fall APPLIED PHYSICS LETTERS carried a technical paper describing his method for copying. A more detailed article on the subject will appear in a forthcoming issue of APPLIED OPTICS.

To understand the difficulty of copying a hologram, one must first know how a hologram is made. A single powerful laser

(Continued on Page Four)



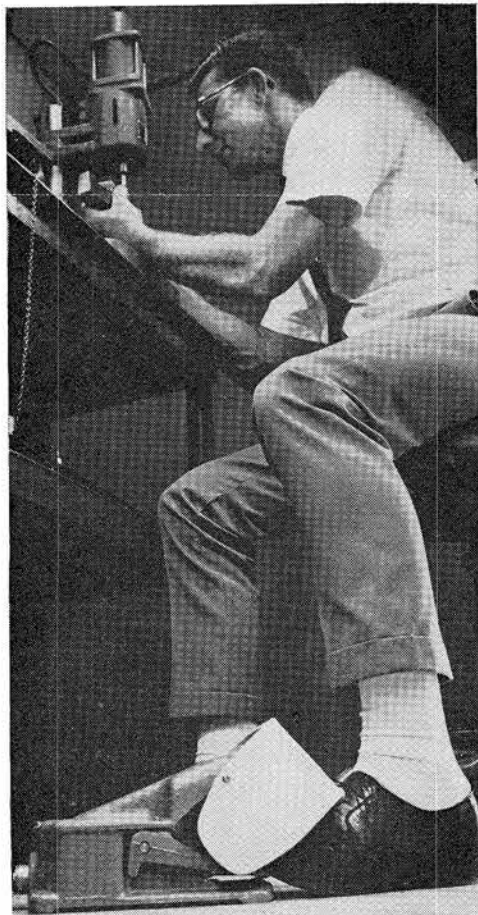
### Editorial Comment

School's about to start again and thousands of children will soon be traipsing across the city's streets.

Little minds filled with new places, new friends and new experiences. Curious, active minds that skip and hop from one topic to another, but at times become absorbed with something to the exclusion of all else. Little figures running and darting, heedless of the world about them. A child may not see the oncoming car. The driver must see the child.

Don't turn a happy laugh into a horrible scream. Drive carefully.

## Apprentice Designs Foot-switch Cover



SAFETY SHIELD for foot switch used to activate machinery is demonstrated by Billie W. Huffman (4233-2), device designer.

A simple inexpensive safety shield for foot switches has been designed and developed by Billie W. Huffman (4233-2).

Billie, who completes Sandia's four-year electronics apprenticeship program Sept. 1, suggested the protective shield for foot switches following a recent minor accident in the electronic apprentice shop. Another apprentice was adjusting a power punch machine used to press terminals into phenolic boards. Concentrating on the machine's head, he accidentally touched the switch with his foot. The activated machine gouged his finger.

Because it should prevent similar accidents, Billie's safety shield was placed on all foot switches in the electronic apprentice shop within a few days. It is simple to fabricate and install.

The safety shield hangs in front of the foot switch. To activate the switch, an operator must flip up the cover with the tip of his shoe before he can place his foot on the switch in the box. When his foot is removed from the switch, the shield drops back into place. A small felt strip is attached to the shield's lower lip which rests on the operator's foot.

## Computer Now Performing Routine Engineering Design in Division 2451

Computer programs are performing routine engineering design in Product Tester Design Division 2451.

According to James M. Phillips, project engineer for the development of the new computer programs, the design of the connecting cable between a standard automatic production tester and a new weapon component cable has always been a "cook book" job—long, tedious, and strictly by the rules.

"The manual interface design job is particularly tedious and repetitive, and certainly does not make the best use of engineering talent," is the way Mr. Phillips said it.

A typical interface design job required from 75 to 100 hours of engineering and drafting time. The new computer programs have reduced this by a factor of four—to about two hours of engineering time and 24 hours from a draftsman. The programs require about 15 minutes of computer time.

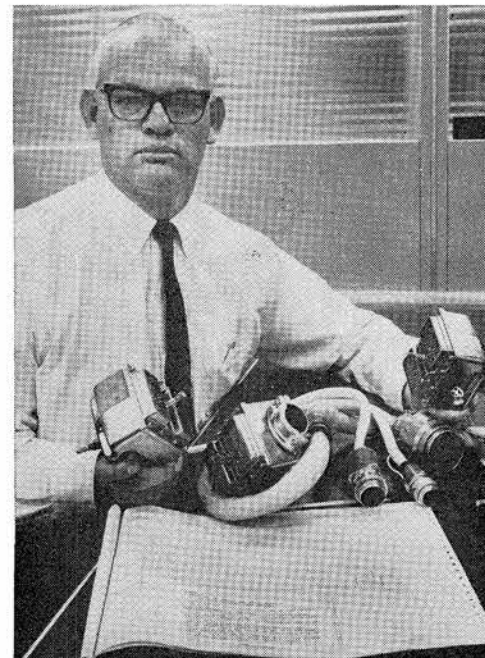
The computer output consists of a materials list (from the standard list, already automated for the AEC weapons complex), a "drawing" which is not realistic or in scale but contains a complete physical description including dimensions of all links, connectors, and wiring, and a set of wiring instructions (connect pin 3C to pin XX, etc.).

From this computer output, a man in the Development Shops can easily fabricate the connecting cable.

About a year ago, Division 2451 decided to explore the possibility of putting this design task to a computer. A Sandia contract was awarded to a consulting programming firm. Mr. Phillips worked closely with them until the recent successful conclusion of the project.

The consulting firm developed four programs which are used to produce any interface design job for the automatic tester. One part of the program draws on the automated material list, another program provides the drawing designation and drawing record. Heart of the system is the "decision-making" program which compares the tester's capabilities with the required cable performance and systematically checks its memory for the "rules" which govern the interface design. The final program provides the output in a usable form. It includes a detailed point-to-point wiring instruction for the fabricator.

Other important parts of the computer output are the circuit description and cable layout diagram which are tabular



JIM PHILLIPS (2451), project engineer, displays an interface cable which links a production tester to a component to be tested. The interface cable was designed by a computer. The computer "drawing" and wiring instruction list is in foreground.

presentations relating test number (which is indicated on the tester panel during operation of a test) with the test function underway. This is precisely described so that a test failure can be pinpointed for the test operator.

"The overall system has been demonstrated to our satisfaction," Mr. Phillips says. "In addition, we have sent the information to other users of the tester within the AEC complex. They have indicated an enthusiastic interest. There will be many applications of this development in the future."

### Sympathy

To Paula Schultz (7211) for the death of her mother in Albuquerque, July 28.

To C. J. Lucci (4513-1) for the death of his mother in Ohio, Aug. 18.

### Congratulations

Mr. and Mrs. Richard Rogers (4151), a son, David Wilson, Aug. 6.

## Guidance Counselors Learn Firsthand Of Skills Needed by Local Industries

Participants in a Vocational Guidance Institute, being held at the University of New Mexico this month, recently visited Sandia Laboratory and several local firms. The purpose of the visits was to gain a

better understanding of the skills being sought by various employers.

The institute was sponsored by the 38 local companies supporting Plans for Progress, a private voluntary program to provide leadership in achieving equal employment opportunity and full employment of individuals according to their abilities. W. G. Funk (3150) is chairman of the Plans for Progress steering committee. F. A. Leckman and W. L. Dodd (both 3153) are two members of this committee.

Eleanor Kelly (3151), an employment interviewer for prospective graded employees, was among the 30 guidance counselors, administrators and teachers chosen to attend the three-week institute.

Objective of the institute was to give participants an insight into the labor requirements of local industries. In this way they could better advise students of the skills and knowledge needed for available jobs. The program is especially aimed at students who will not attend college.

Lectures, seminars, workshops, field trips and evaluation sessions were conducted by the UNM Department of Education, Guidance and Special Education.

At Sandia Laboratory, the group visited the Mechanical and Electronic Apprenticeship areas, Design Drafting Section A VI, 7090/3600 computer area, facilities for Environmental Health Department, and the Sphere of Science. Participants had an opportunity to speak to students taking part in the Youth Opportunity Campaign and to a graduate of the apprenticeship training program.

As Miss Kelly explained, "The tour was intended to make the advisors aware of the complexity of the jobs here and at the same time point out the opportunities for advancement that are available through out-of-hours training and other programs."



GLASS BLOWER Foster E. Tennant (4224-5) demonstrates his skill before visiting Vocational Guidance Institute group. Left to right are Lucy Dobkins, Hoover-Aspen School; Robert Frank, University of Northern Iowa; Sandia's Eleanor Kelly (3151); Vidal Velarde, Albuquerque High School; Paul Lynn, Albuquerque High; and George Lloyd, Del Norte High.

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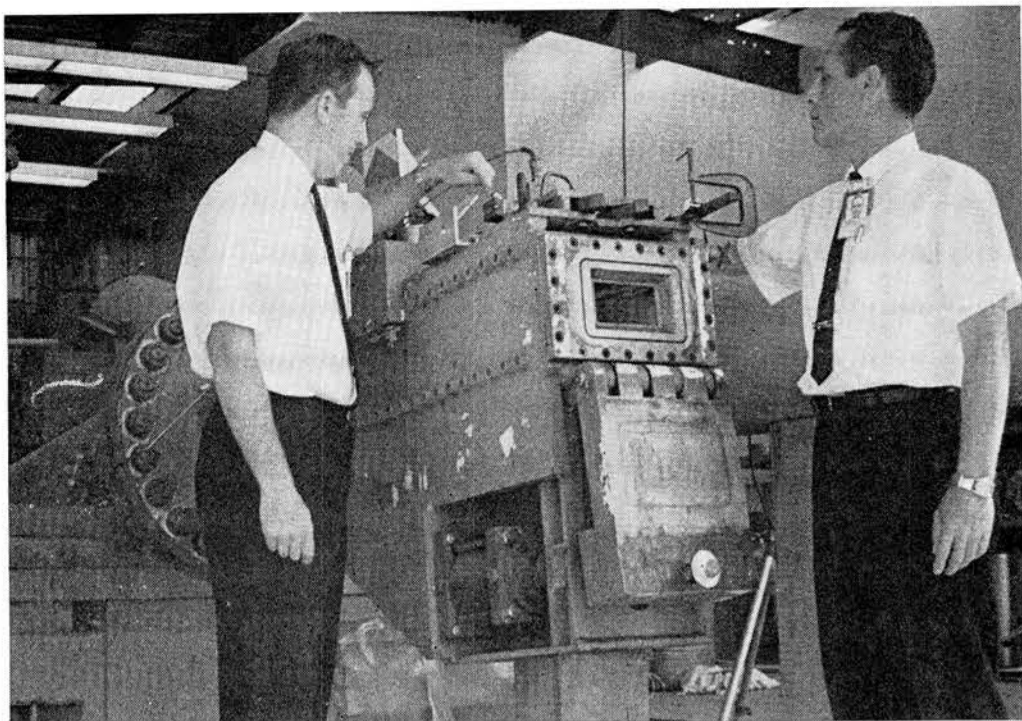
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"SQUIRT GUN" designer Ralph A. Thompson (8147), left, discusses operation of the door-release mechanism with project leader L. R. (Dick) Myers (8128). The environmental test gun uses frozen peas to measure water velocity through the gun's test section.

## Frozen Peas Used in 'Squirt Gun'

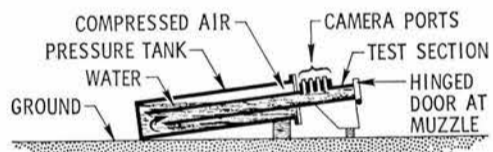
Frozen peas — without butter sauce — are being used by Livermore Laboratory engineers to measure water velocity created by Sandia's Water Pressure Velocity Generator ("squirt gun"). The peas, mixed with the water in the gun, provide a means for high-speed cameras to record the speed of the water during tests on a data-recording capsule.

Macaroni, popcorn and plastic foam were tried before peas. But they did not travel with the water or show up in pictures. Only peas, with a density near that of water, remained suspended and could be photographed properly.

"Firing" the test capsule diagonally across a stream of pressurized water in the barrel of the squirt gun simulates the conditions the capsule would encounter while traveling 30 miles per hour in water.

Designed three years ago by Ralph A. Thompson (8147), the gun is being used to determine the capsule's performance and the specifications to which its thrust mechanism must be manufactured.

The squirt gun consists of a 23-foot rectangular steel column open at one end and closed at the other with a hinged steel door. Approximately three-quarters of

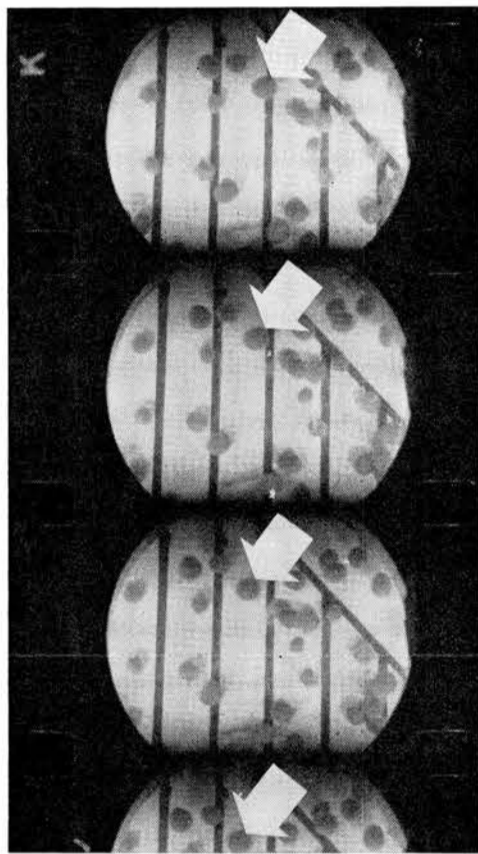


this column is surrounded by a second steel column able to withstand a pressure of 7000 pounds per square inch. This part of the gun is known as the pressure tank.

The remaining one quarter of the gun is the test section. Grid lines, one inch apart, are painted on the bottom of the test section.

After water is added to the gun, frozen peas are poured into the muzzle. The steel door is shut and the gun is pressurized.

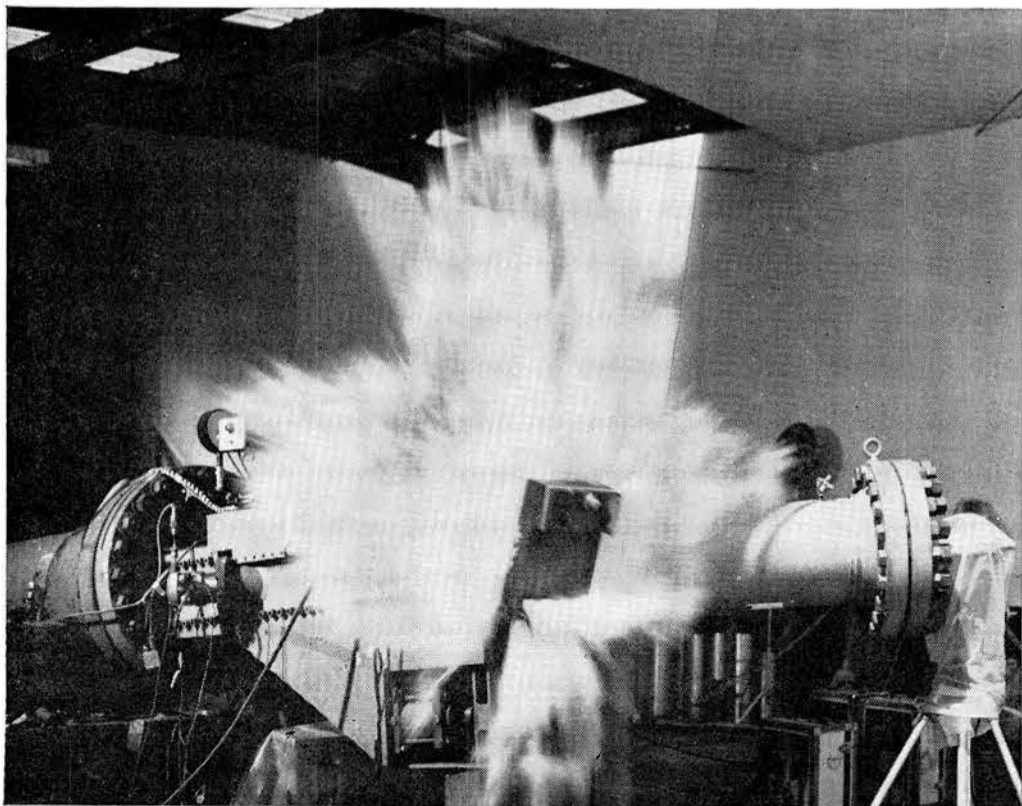
To start the test, an electrical signal trips the steel door. Water and peas burst out. Photo flash bulbs fire while cameras roll at 4000 frames per second. The move-



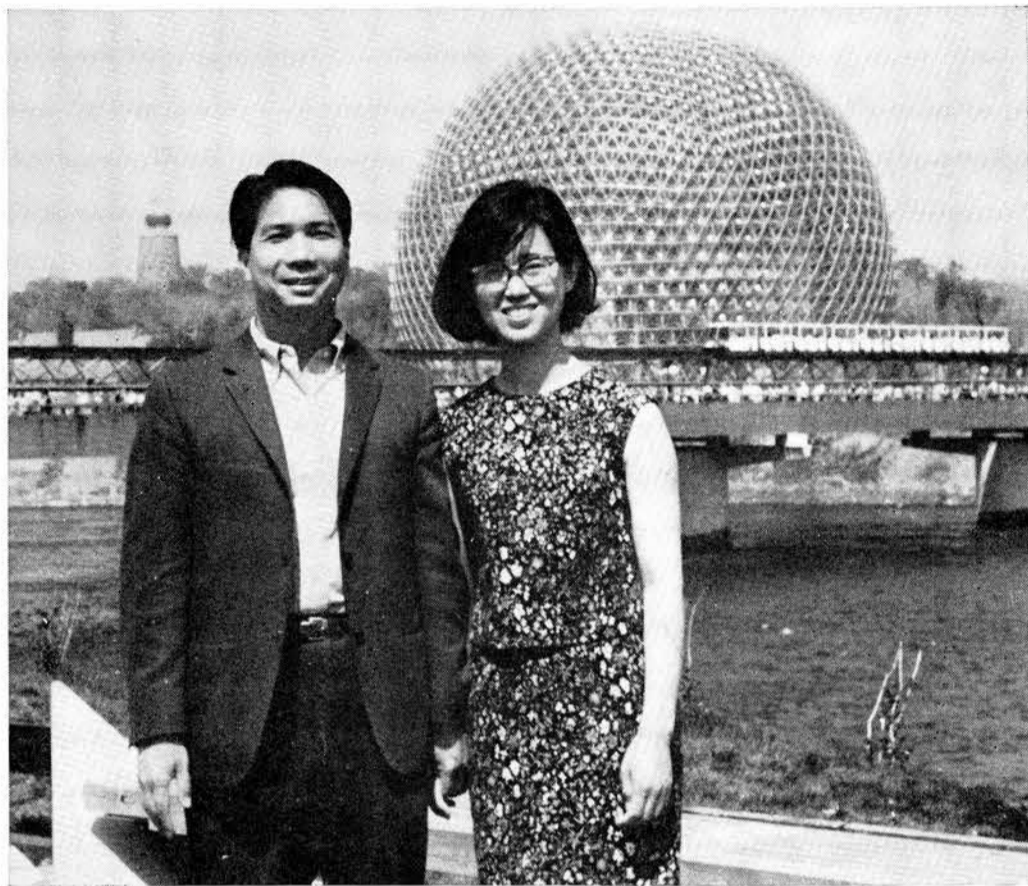
GREEN PEAS MOVE across one-inch grid lines painted in bottom of squirt gun's test section. Distance one pea moves related to the number of frames per second provides water velocity measurement.

ment of the capsule through the stream of water is recorded, as are the peas as they move across a one-inch grid. This latter recording determines the water's velocity.

Then, just as suddenly as the test started, it's over. Elapsed time — one-half second. The hillside, 150 feet away, is sprinkled with peas and soaked with water that came from the gun at a rate of 200 gallons per second.



WATER BURSTS from the muzzle of the squirt gun as the steel door is released.



U.S. PAVILION is shown directly behind Su Chiu (8147) and his wife Frances during their recent visit to Expo '67. The unique "bubble" dome building follows the theme "Creative America," illustrating accomplishments in the arts, space, and technology.

### Impressions of Expo '67

## Two Livermore Lab Employees Visit Canadian World's Fair

Both Hans Birnbaum (8138) and Su Chiu (8147) had the opportunity to visit Expo '67 this summer. Expo '67 celebrates Canada's centennial confederation and the 325th anniversary of the founding of the city of Montreal.

Both report the exposition was "great!" —interesting and entertaining, yet educational—and well worth the vacation days spent there.

As Hans expressed it, "Expo '67 is truly a world's fair." He added, however, that to see the fair in its entirety, a person should allot a full week. "I had only two days and three nights, and rushed the whole time except when I waited in line at one of the popular exhibits." (Su was more fortunate—he and his wife were able to spend six days at the fair.)

Hans said that most people buy a general admission ticket in the form of a "passport." The passport has a large number of blank pages which are stamped as a person goes from one pavilion to another.

A minirail train travels around most of the fair located on a complex of largely man-made islands in the St. Lawrence River. "I used the mini at the beginning to obtain an overall look at the fair," Hans said.

He felt some of the most popular exhibits were those of the Canadian Telephone Company, Great Britain, Czechoslovakia, the United States, and the Soviet Union. "Nearly every country features a film showing its accomplishments. In this respect you might say the fair was a big film festival."

Hans commented that the U. S. building is well done and gives the people of the world a picture of our space accomplishments and what the future might bring, plus a look into our political campaign systems and who's who in the movie industry.

Art works displayed by Czechoslovakia and Belgium were particularly outstanding, according to Hans. The 21-foot-high sculptured aluminum statues in the Great Britain exhibit were most impressive.

"If a person is a stamp collector, he can have a ball, for nearly every major country sells a special issue," Hans said. "The United Nations has a special post office at the fair which sells its latest issue."

When you enter Canada, and especially Quebec Province, you are in a bi-lingual area. Talks or directions at the fair were always given in both French and English.

Su felt the theme buildings depicting "Man and His World" provide particularly

good education programs and, alone, are worth the price of admission. Through the five general subthemes—Man the Explorer, Man the Producer, Man the Creator, Man in the Community, and Man the Provider—one learns about mankind's past, present and future.

Labyrinth, a theme pavilion of functional architecture, presented simultaneous film projections both in front of and below the audience, giving an in-depth feeling and an unforgettable experience, according to Su.

Another theme pavilion, Habitat '67, demonstrated the futuristic concept of urban living. "Though expensive at \$750 a month for a four-bedroom unit, Habitat will surely make an impact on current architectural trends," Su said.

Su noted that Canadian life and natural beauty were well portrayed in Canada's pavilion through excellent films shown in a revolving theater where the audiences, seated on a platform, passed before five stages, some equipped with multiple screens. The telephone pavilion also covers Canada with a Walt Disney film in "Circle-Vision 360," and the pavilion of Western Provinces has an unusual underground setting devoted to Canada's western resources and development. Here, one rides in a mine cage down a simulated 3000-foot shaft.

As Su expected, he saw a great deal of technology exhibited in the Russian pavilion, especially in the space and nuclear fields; but what was unexpected was the very interesting fashion show he and his wife enjoyed there.

### Congratulations

Mr. and Mrs. Steve Berglund (8142), a daughter, Christine Diane, July 14.  
Mr. and Mrs. Omer Fettahlioglu (8147), a daughter, Suzan Mujgan, July 19.  
Mr. and Mrs. Ralph Thompson (8147), a daughter, Julie Lynn, July 22.

### Welcome . . . Newcomers

July 18 - Aug. 14

California	
Charles V. Brown, Oakland	8235
Stephen T. Cvitovich, Jr., San Francisco	8254
Justin H. Hermo, Fort Bragg	8223
Bonnie J. Kaya, Castro Valley	8117
Lois A. Krause, Livermore	8235
Mary T. McKamey, Livermore	8212
Richard K. Saito, Oakland	8252
*Charles B. Sonntag, Berkeley	8125
Norman V. Tassevigen, Redwood City	8222
New York	
Michael R. Birnham, Brooklyn	8147
* Denotes rehire	



OPERATION OF ANNULAR CORE PULSE REACTOR is described by Paul D. O'Brien (5223), left, to Mel McCutchan (3132). Paul will present the nuclear reactor fundamentals lecture as part of a new lecture series in Sandia's Out-of-Hours Program.

## Survey Lecture Series Included In Out-of-Hours Program This Fall

A new program presenting a noon-hour series of survey lectures in the Sandia Theater Bldg. 815 will be incorporated in Sandia's Out-of-Hours Program starting next month.

During the fall, a total of eight lectures — with from 4 to 12 sessions each — will discuss the most recent developments in the expanding areas of science and engineering. Some of the lectures were originally presented in the USE (Unified Science and Engineering) Program for Sandia supervisors.

Enrollment in the non-credit science and engineering lecture series is limited to staff assistants, staff associates and staff members, on a first-come basis. Enrollments will also be accepted for individual lectures which are designed to be self-contained units. Lecture notes will be provided.

The lecture series starts Sept. 22, with most of the sessions scheduled Mondays through Thursdays.

Subjects and the lecturers are vector and tensor analysis, R. A. Damerow (5141); aerodynamics, M. M. Sluyter (9321); modern physics, J. E. Houston (1123); thermodynamics, J. G. Eberhart (1111); nuclear reactor fundamentals, P. D. O'Brien (5223); solid state physics, D. K. Brice (5211); and lasers, M. J. Landry (7226). The materials science lecture will consist of several sessions on each of the following topics: chemical bonding, J. G. Eberhart (1111); metals, M. M. Karnowsky (1131); ceramics, E. K. Beauchamp (1123); and polymers, R. K. Traeger (1111).

A bulletin, including a description of the lectures, a schedule and an enrollment blank will be distributed next week.

*Continued From Page One*

## Holograms New Research Tool

beam is divided into two beams by an optical device. One beam (the reference beam) falls on a high resolution film plate (greater than 2000 lines per millimeter), the second (the scatter beam) is directed to the object to be photographed — or is it "holographed"? Light waves are also reflected from the object to the film; therefore, it is the interference pattern formed by the mixing of the two light waves that is recorded on film rather than the conventional photographic image.

To the naked eye, the film plate appears to bear no relationship to what has been recorded upon it. The mass of swirls and wavy lines most closely resembles a terrain map. It is only when the hologram is again placed in a laser beam that the three-dimensional, floating effect is achieved.

There is still another peculiarity. When a regular negative is rotated on a horizontal plane, the left side becomes the right side. Not so with a hologram. A horizontal rotation causes the top of the image to become the bottom. To acquire a right to left turn in the image, the hologram must be rotated vertically."

When it comes to copying a hologram, there are several major reasons why a conventional photographic copying technique cannot be used. As Mr. Landry explains, "The interference fringes contain information that can only be retrieved when light of a narrow wavelength band is used to 'play back' the hologram. Also, the film plates must be oriented properly relative to the incoming copy light."

Mr. Landry felt that since the original hologram had been made using a laser beam, perhaps it would be necessary to recreate the same conditions when making copies — for example, the high resolution plates and the monochromatic light. He began to test his theory with a hologram borrowed from Los Alamos Scientific

Laboratory and some 72 hours later, a good copy was made.

With continued experimentation, he found that there were four critical factors: the right kind of light (laser beam in this case); the right kind of film plates; the proper orientation of the copy assembly relative to the beam of the light source (along the direction of the original reference beam); and the proper separation between the original hologram and the copy plate.

"Best results were achieved with the emulsion sides of the hologram and the copy plate in vacuum contact," he explains. It is possible to separate the plate and the hologram as much as two inches, but both the quality and any wide-angle information are decreased.

Why make a copy when the original hologram could be cut into tiny pieces (each containing an entire image)? Unfortunately, as the hologram becomes smaller in size there is a considerable loss of image detail. With the copying process, Mr. Landry has made many generations of copies of some holograms before the image became too poor to be acceptable. L. E. Erne (3465), A. E. McCarthy (5214), Lyle Wetherholt (9230), and M. E. Morris (2572) aided Mr. Landry in his study.

There appear to be many uses for holograms, although the field is so new that many potential applications are still under study. Included are studies of particles in three-dimensions, vibration analysis, high velocity ablation or air streams, stress analysis, microscopy, and information storage in automatic data processing systems. Extremely short exposure times, movement recorded by double exposures, and color holograms (made by using two or three lasers of different wavelengths) are features that greatly increase the number of potential applications.

### Starting Back to School Soon

## YOC Trainees Give Sandia Success Story

More than anything else, Americans like success stories.

After a long hot summer and all that the country has been through, here's a genuine success story — the third summer of Sandia's Youth Opportunity Campaign.

The youth trainees joined us in early June — 100 at Sandia Laboratory, 10 at Livermore and one at Tonopah Test Range — and they were bright youngsters eager to do a good job.

They ranged in age from 16 through 21. Fifty-three of them had one year of college, 49 had just completed high school, and eight had one more year of high school. They're going back to school next week. Sandia will miss them.

The program is part of President Johnson's effort to provide temporary summer work and training experience for the nation's students. This is the third summer that Sandia has participated in the program. Students were selected on the basis of their personal qualifications and degree of economic need. The summer at Sandia made returning to school possible for many who otherwise would not have been able to continue their education.

As part of Sandia's personnel program, YOC trainees are evaluated by their supervisors. Following are some excerpts from these candid comments:

"Words alone cannot express what a pleasure it is to have an individual of the character and ability of ..... come out of our schools to work in industry.

All the bad impressions one gets of youth from incidents of protest, riots and moral laxity are quickly dispelled by these representatives of our younger generation.

"..... has shown an extremely high aptitude for grasping the core of a problem, the quality of her work is far above average, and her ability to produce in quantity is exceptional . . . during the short time she has been with us, she has developed a strong interest in data processing to the degree that she is strongly considering a career in this field upon completion of her education."

Another supervisor wrote:

"Here is an intelligent, hard-working, eager young man. If it wasn't for the fact that he wants to attend college, I would do all I could to encourage the Company to keep him as a permanent employee. He certainly has done his share of the work in our group . . ."

"..... is a quiet person and doesn't react outwardly. However, he enjoys his assignment and likes to keep busy. He has been of considerable assistance to us this summer and has been given responsible jobs."

Still more:

"He has provided valuable work for us in data analysis (Quality Control) — also, he has been very willing to perform routine work assignments."

And one more:

"We are unanimous in feeling that we are very fortunate to have had her assigned to our organization. She has been an extremely eager and willing worker."

These evaluations and others just as complimentary are on file in Personnel Division II 3154. The tabulation of ratings for the group of Sandia Laboratory trainees shows 15 in the excellent category, 76 above average, 19 average and one below average.

That's a success story in anybody's personnel program.

## Retiring



Ruth D. Wood will retire from Sandia Aug. 31. She joined the Company in January 1952 and until March 1962 worked in a number of organizations as a secretary. In 1962 she transferred to Division 4315 of Purchasing organization as a service clerk working with purchase order records.

Ruth has no definite retirement plans. "I think I'll just play it by ear," she says. Ruth has a married daughter and three grandchildren living in Ft. Lewis, Wash., and a son attending graduate school at the University of Michigan.

## Speakers

M. J. Landry (7226) and J. R. Lochner (1316), "A Mobile Laser Transceiver Used for Detecting Long Range, Slow Velocity, and Low Density Targets," First International Conference on Laser Application, July 18-23, Paris, France. Paper was read by Dr. Marcel Locquin, director of the conference.

M. M. Robertson (1122), "Airborne Scanning Photometer Measurements of Conjugate Aurora," Aurora and Cosmic Ray Symposium, July 18-19, Los Alamos.

R. L. Levesque (7226), "Professional Status," 12th Annual Technical Symposium for the Society of Photographic Instrumentation Engineers, Aug. 7-11, Los Angeles.

C. H. Purdue (2442), "A Reliability Program Utilizing Circuit Analysis Computer Programs," First University of Missouri Summer Institute on Computer-Aided Circuit Design, Aug. 14, Columbia, Mo.

R. T. Johnson, Jr. (5132), "Effects of Fast-Neutron Irradiation on the Electrical Properties of CdS," American Physical Society Meeting, Aug. 31-Sept. 2, Seattle, Wash.

Albert Goodman (5637), "Some Things that the Future May Bring," Bernalillo Rotary Club, Aug. 16.

J. W. Reed (7111), "Sonic Booms," Sunport Optimist Club, Aug. 16.

D. C. Wallace (5155), "Calculation of Specific Heat of Crystals from Measured Phonon Frequencies," American Physical Society Meeting, Aug. 31-Sept. 2, Seattle, Wash.

J. A. Cooper (1425) and C. D. Ouverson (1424), "A Technique for Analyzing Antenna Pattern and Radar Return Effects on Spinning Vehicles," WESCON technical program, Aug. 22-25, San Francisco. E. C. Neidel (1422) moderated a session on "Considerations for Joining Techniques" during the International Electronic Circuit Packaging Symposium held in conjunction with WESCON.

C. A. Olson (7221), "Cloud Seeding," Sunrise Optimist Club, Aug. 29.

O. L. Wright (4610), "History of Sandia Base," Sunport Optimist Club, Aug. 30.

J. P. Grillo (3311), "Heavy Metal Poisons," Heights Optimist Club, Aug. 30.

K. J. Touryan (9326) and D. W. Boyer (Cornell Aerolab), "Studies of Microwave Transmission Through a Hypersonic Air Plasma," WESCON meeting, Aug. 22-25, San Francisco.

F. L. English (5143) and M. K. Parsons (5132), "Inhomogeneities in the Resistivity of Single Crystal Cadmium Sulfide," International Conference on II-VI Semiconducting Compounds, Sept. 6-8, Providence, R.I.



Mary Ann Aikin (9411)

## Take a Memo, Please

Safety is an awareness, an approach to each task that combines responsibility with the instinct for self-preservation. No job is so important and no service is so urgent that we cannot take time to perform our work safely.



**Coronado Club Activities**

# T. A. Sellers New Club President; Water Carnival, Golden Nugget Set

The newly-elected Coronado Club Board of Directors has elected officers and assigned responsibilities.

New president of the board is T. A. Sellers (9223). Vice president is D. M. Olson (1510). H. A. Romme (4113) is treasurer and J. V. Durant (AEC) is secretary.

Other directors and their assignments are as follows:

J. H. Stoeber (5142), game nights; G. O. Moe (5542), publicity; O. B. Tjeltweed (8157), entertainment; W. G. Weinbecker (4252), special activities; and R. W. Mottern (7322), travel, membership, and lounge.

AEC representative to the board is D. P. Dickason and R. J. Blount (3120) is the Sandia Corporation representative.

\* \* \*

**Water Carnival**

Tomorrow is a big day all day at the Club.

Starting at 11 a.m. with recreational swimming, the pool and patio area will be the scene of swim races, diving competitions and other games for kids until 12:30. The fun continues all afternoon for the entire family. Refreshments at special prices will be available.

No tickets are required, but members only, please.

**Golden Nugget Night**

After the swinging Water Carnival, move inside for the free-wheeling Golden Nugget Night event. An annual affair with a wild west flavor, the fun starts at 8 p.m. Games of chance using play money are featured. Big winners, however, win real prizes.

Sandwiches and other goodies will be available at nominal prices. The Rio Ramblers will play the sagebrush shuffle beginning at 9 p.m.

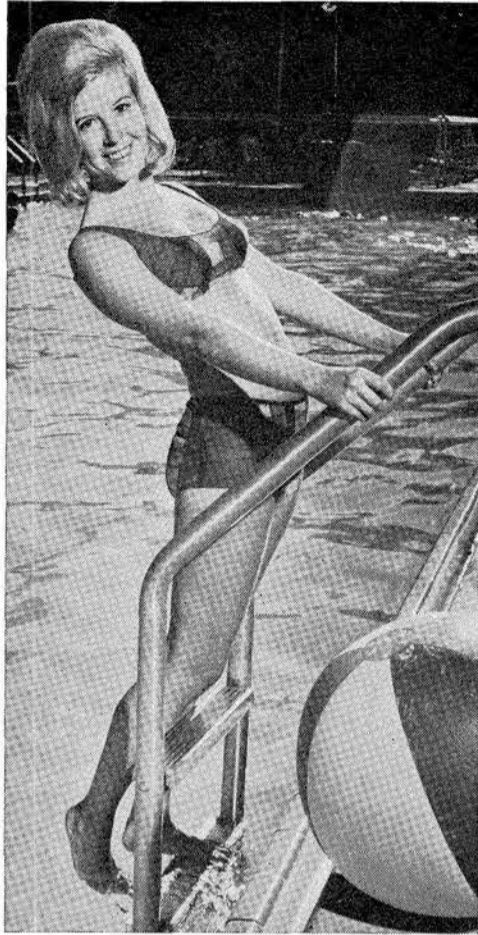
Admission (no reservations required) is \$1 for members, \$2 for guests.

**Social Hours**

Bring your chop sticks to the Chinese food buffet at social hour tonight. Tommy Kelly will be up to his Shanghai shenanigans on the bandstand while your favorite refreshments will be available at rock bottom prices. Admission to the buffet costs \$1.50 for adults, \$1.25 for kids. Pat Reich will entertain in the main lounge with swinging piano and swinging customers.

Moving into September, Friday the 1st will feature Don Lesman on the bandstand and the famous Coronado Club Mexican food buffet. Pat Reich and piano will entertain in the main lounge. The buffet costs \$1.60 for adults, \$1.30 for kids. Ole!

On Friday, Sept. 8, social hour will spread an assortment of Wisconsin cheeses and other goodies for a "Wisconsin Dairyland Buffet." If you don't think this is the greatest thing in life, ask Pete



SUZANNE BURGESS (7130) invites Club members and their families to the annual Water Carnival tomorrow starting at 11 a.m. at the Club's twin pool and patio area. Fun and games are planned all day with special diving and swimming competitions for the youngsters. Refreshments and goodies at special prices will be available.

Klemm (4614-2) about Wisconsin cheeses. On the bandstand, Phil Graham will make the happy music. The buffet costs \$1.75 for big people, \$1.50 for little ones.

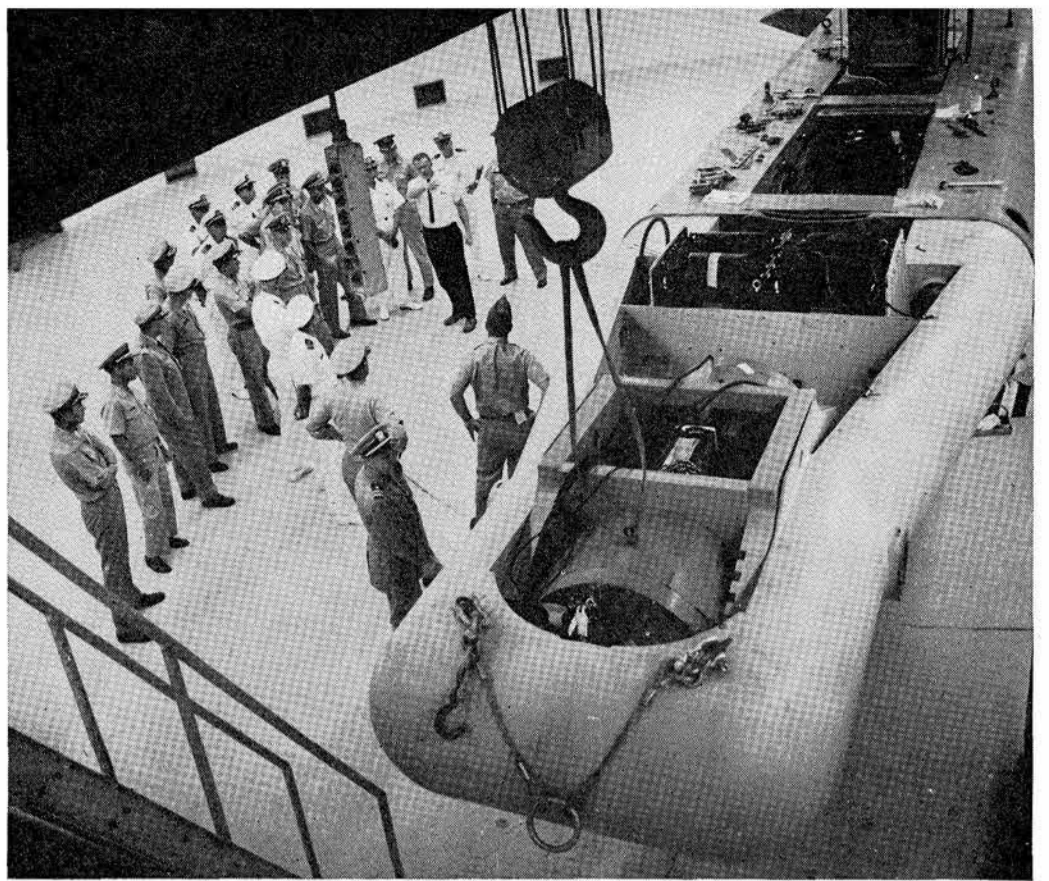
**Swimming Pool Closes**

The weather is getting cooler. The lifeguards return to college classes. The twin pools wrap up the season on Labor Day. Both pools will be open regular hours but other Club facilities will be closed for the holiday.

A word to the wise: To qualify for next summer's "continuous member rate" for the swimming season, join the Club before Sept. 1. The continuous member family rate for the entire season is only \$5. A non-continuous member pays \$28 for a family season ticket.



FASHION MODELS—Members of Beta Chi sorority will present a show, "Travel in Fashion," open to the public at 2 p.m. Saturday, Sept. 2, at the Coronado Club. Proceeds from the event will support various welfare and service projects conducted by the group. Among the models will be Eve Baughman (3126), Theresa Gruhn (1520) and Cynthia Harris (2211).



TOUR SANDIA—About 60 Naval Reserve officers, attending a two-week Research Seminar on Sandia Base, toured Area III last week. Among environmental test facilities visited was Sandia's huge underground centrifuge, above. The facility is currently undergoing modification to provide simultaneous vibration and centrifugal force environment for weapon system testing.

## Retiree Charlie Ross Likes to Take Things Easy But Doesn't Sit Still

When Charlie Ross retired in February 1964, he had enough chores around his home at 1408 Third NW to keep him busy and involved for a good six months.

"Then I was in trouble," Charlie says. "What to do now?"

Like most of us, Charlie thought of retirement as a fine time in the future when things were going to be easy. There would be plenty of time to do all those things that never seem to get done when one has a full-time job.

When the home projects were finished, Charlie took a trip to Missouri to visit his daughter and grandchildren in Neosho. He and Mrs. Ross had a great time and Charlie went fishing. He also did a lot of thinking.

"I like fishing," Charlie says, "but I don't like it enough to do it all the time."

When Charlie came back to Albuquerque that summer, he started looking for a part-time job—no easy task when you are retired. He found two of them. During the baseball season, he parks cars for the games at Tingley Stadium. In the winter months, he is a uniformed, school-crossing guard.

"Just the right amount of activity," Charlie says. "I felt better. After an active life, it's tough to do nothing."

Charlie has always liked people. In retirement he finds that people become more important.

"I get to know the kids at the crossing," he says. "And I look forward to seeing them each day. In a way, they become my kids. I'm responsible for them."

He has become more active in the Elks Club and maintains contact with his friends at Sandia. He worked in the packaging shop and as a motor pool driver during his 12 years with the Company.

"I like the pace now," Charlie says. "No hurry. Something to do each day and plenty of time to do it."

Charlie's current project is his garden. This year his sunflowers are outstanding—the plants are more than 15 feet tall and loaded with large blossoms.

"But I grow better tomatoes," neighbor Fred Buttrey yelled from across the fence. "Want to take my picture?"

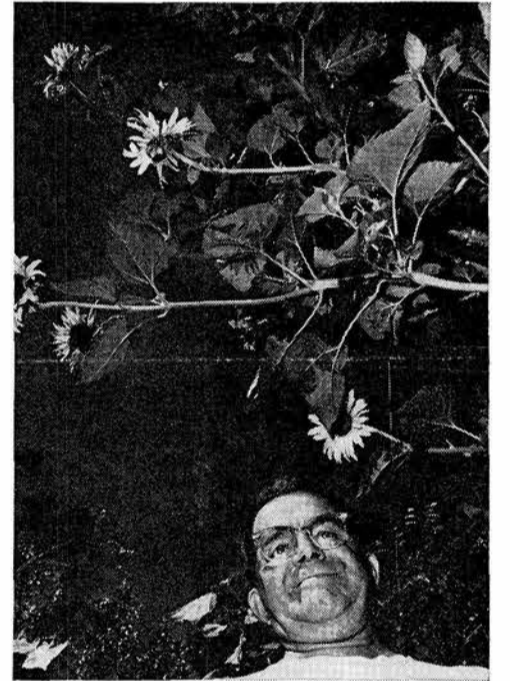
"Who's interested in those puny things?" Charlie yelled back.

Fred, a welder with Sandia for 19 years, retired in October 1965. Charlie and Fred maintain a friendly competition with their gardens and often discuss the problems of retirement.

Unlike Charlie, Fred really enjoys fishing. He has a cabin in the Pecos wilderness and spends most of the summers there. In the fall, he travels to California and hunts pheasants. And Fred still hasn't caught up on his home chores. Currently he's putting new shingles on his roof.

Both retired Sandians agree on a couple of things. First, start planning retirement early. Second, get a number of activities going for you.

"You can take it easy," Charlie says, "but you can't afford to sit still."



RETIREE CHARLIE ROSS stands beneath one of his 15-foot sunflower plants. Gardening is only one of his many retirement activities.

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