

A Piece of the Action

# Sandia Helps in Apollo Moon Program

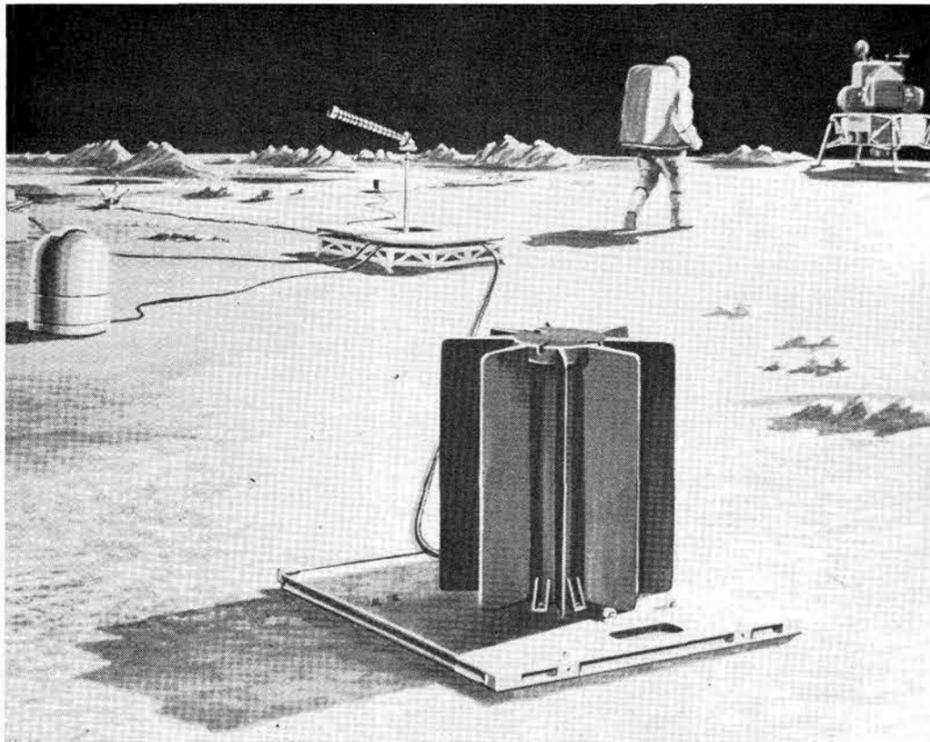
## SANDIA LAB NEWS



VOL. 21, NO. 11, MAY 23, 1969



SANDIA LOADING TEAM, responsible for placing the SNAP-27 plutonium 238 fuel capsule (with a surface temperature of 1375°F) on the LM at the Saturn V launch pad, prepare for a practice run in Bldg. 892. From front are Al Stephenson (9521), team leader; Jim Leonard (9521), SNAP-27 technical director; Bob Wemple (9511); and Carl Sisson (1543). Not shown are team members Bob Pace and Watson Snyder (both 7233).



ARTIST'S SKETCH shows the SNAP-27 isotopic generator in the foreground with cables to an array of scientific experiments which will be positioned on the lunar surface. The generator will provide 70 watts of power for the instruments for a minimum period of a year. In background, an astronaut walks toward the LM spacecraft.

The outstanding scientific achievement of the twentieth century will be placing a man on the moon.

Sandia will have, so to speak, a small but important piece of the action.

The last rehearsal flight to the moon is in space now. A team of six Sandians loaded a dummy SNAP-27 system on Apollo 10. Sandia will not participate in Apollo 11 which is the first scheduled landing on the moon's surface later this summer. Apollo 12, 13, and 14, however, will carry the SNAP-27 isotopic power system and the Apollo Lunar Surface Experiments Package (ALSEP), a highly sophisticated array of scientific instruments which is expected to contribute immeasurably to prevailing theories of the evolution of the moon and earth.

The SNAP-27 system, which will provide power for the ALSEP, is Sandia's concern.

Al Stephenson of Isotopic Power Systems Division 9521 and his team will support the Albuquerque Operations Office which has the responsibility of loading the SNAP-27 plutonium fuel capsule on the Lunar Module (LM). The fuel capsule with its surface temperature of 1375°F, is carried through space in a protective graphite cask on the outside of the LM. Once on the moon, astronauts will remove the fuel from its graphite cask and insert it into the SNAP-27 generator.

The loading job will be performed more than 330 feet above the ground at the top of the third stage engine of the giant Saturn V rocket which will boost the astronauts into space. The Sandians have attended several training schools in preparation for the task and have performed a number of "dry runs" during test count-downs at Cape Kennedy.

They are familiar with pad safety and the intricacies of working near "hypergolics" — the exotic and volatile fuel which is used in the spacecraft engines.

At the time of the SNAP-27 fuel capsule loading, five Sandians will be on the upper level of the gantry. Loading time for the capsule is T minus 15 hours. If all goes

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Mesosphere Explored

# High Altitude Meteorology Looks at Thin Air

Among the least explored frontiers of Earth is the vast area in the upper atmosphere between 100,000 feet and 100 miles. This area, bounded on the lower level by the maximum altitude of balloons and on top by the minimum altitude of satellites, takes in all of the mesosphere as well as parts of the stratosphere and thermosphere.

A small group of scientists is now striving to explore, to chart, and ultimately to understand this region. Among these scientists is Larry Smith, a meteorologist with Atomic Particle Physics Division 5235. Larry and his counterparts at White Sands Missile Range, the Air Force Cambridge Research Laboratory, NASA, and the Office of Naval Research, plus a few researchers from other agencies, have compiled virtually all of the small but growing body of knowledge about this area.

It is now known, for instance, that Earth's coldest temperature — sometimes lower than minus 200°F — occurs during the summer months at altitudes of 200,000 to 300,000 feet over the polar regions. Yet at altitudes of 150,000 feet temperatures often are only slightly lower than on the surface. Also, between 100,000 and 200,000 feet, winds of greater than 150mph blow from the west in the winter but in the summer reverse and blow from the east. "These are just a few of the phenomena we've discovered which are not yet fully understood," says Larry. "But they open up whole new areas of weather and other meteorological studies."

High altitude meteorology, as the discipline is known, was virtually unheard of before the late 1940's when scientists at White Sands used German-built Viking rockets to obtain data about the upper atmosphere. Considerable investigation had been done at lower altitudes via balloons, and in the early 50's some sound propagation studies of stratospheric winds were done by Sandia's Jack Reed (9150) and by the Air Force Cambridge Research Laboratory. It was the introduction of chaff rockets in the mid-50's that provided the first direct means of observing atmospheric mo-

tion at altitudes greater than 100,000 feet.

Yet the mesosphere remained largely uncharted as late as 1960. Since then, a more methodical approach to high altitude meteorology has been taken with the establishment of the Meteorological Rocket Network. The MRN is a cooperative effort by a number of agencies, including Sandia, to coordinate rocket firings from sites located in both hemispheres.

Larry's specific concern is with the time-space variations of meteorological phenomena (winds, temperature, density) at high altitudes (200,000 to 500,000 feet). His problem is twofold—how the time-space variables affect debris following a high altitude nuclear burst, and how to

predict the behavior of such particulate debris in a given quadrant of atmosphere at a given time of day, month, or season.

The basic tool used in high altitude meteorology is the sounding rocket. Combined with techniques for ejecting chaff, spheres, or vapor trails, it is possible to chart wind turbulence, direction, and velocity. Observers can watch, either optically or by radar, the drift and fall rates of descending objects, and the dispersion rates of materials released in the atmosphere. From such observations it is possible to deduce coefficients for wind, temperature, diffusion, density, pressure, and other meteorological variables.

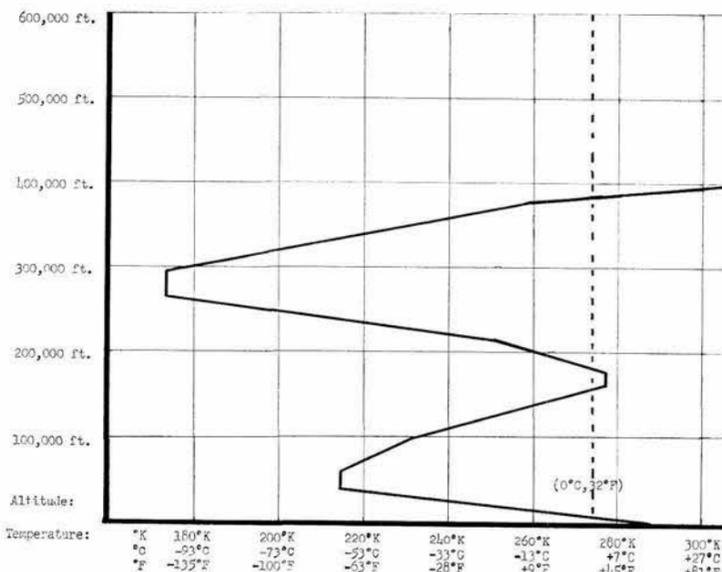
In 1958, Larry began his first intensive

study of high altitude meteorology with a chaff rocket series from Johnston Island in the Pacific and at Tonopah Test Range in Nevada.

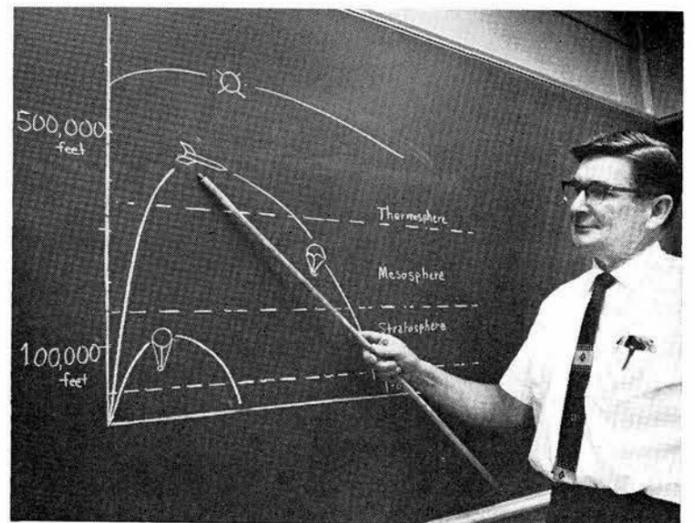
In 1960, a more ambitious study was launched at TTR. As a result of the year-long series of four rocket firings per month, Larry was able to make a profile of wind variations between altitudes of 180,000 and 275,000 feet. The series yielded data on measurement accuracy, fall behavior from free fall to terminal velocity, seasonal distributions, annual variations, and vertical wind shear statistics.

A somewhat different technique was

(Continued on Page Four)



HOT 'N COLD ATMOSPHERE — High altitude observations have verified tremendous fluctuations of temperature at different altitudes. The temperature curve shown here is an average for a standard atmosphere at mid-latitudes and during relatively high sunspot activity. Large variations from this curve will occur.



CHARTING A VAST SEA — High altitude meteorologists, such as Larry Smith (5235), are striving to understand the meteorological phenomena which occur between 100,000 and 500,000 feet. Investigation has shown that temperatures within these altitudes vary from a comfortable surface-like 40-45°F to a chilly -220°F. The area covered by the sounding rocket, a basic tool of high altitude meteorology, is outside the capabilities of either balloons or satellites.



"THE WATER'S UP to your chin you say?" Ralph Ambrose of Telecon commiserates with a caller, while Harold Burrell (both 4517) writes a work order. Busy service desk averages more than 100 calls per day.

**Repair-Replace-Rearrange**

# Telecon — That's What We Need Around the House

Got a problem? Call Telecon. Judging from the volume of business, many people know Telecon is an action and information center. In fact, more than 25,000 phone calls a year are received.

Convenience and speed are two features that characterize the Telecon which is manned by Service Coordinators Harold Burrell and Ralph Ambrose of Maintenance Control Division 4517. They usually write between 85-130 orders a day, not counting the many telephone calls for miscellaneous information or requests for minor services (replacing light bulbs, etc.) not requiring written orders.

Some of the requests are a little strange. One employee, called home by an emergency, wanted to get word to members of his carpool, only he couldn't remember any of their phone numbers. The only number that came to mind was that of the Telecon desk. Harold and Ralph helped out. And every so often someone drops a service-award pin, a ring, or a contact lens down a drain. Then there was the employee who casually requested that a 10 by 30 storage box be built — only the dimensions turned out to be in feet, not inches.

When a call comes in, the work order is written on a "Telescriber" and is simultaneously transmitted to the Plant Maintenance Division in Bldg. 891-F. The service coordinators assign the order to the appropriate maintenance section and estimate time required for the job, but actual scheduling of work assignments (of less than 16 man hours) is handled by the different maintenance section supervisors. As Harold points out, "We only write the orders, the maintenance mechanics are the ones who get the jobs done." Nevertheless, Telecon has a reputation for fast action. But Ralph says, "We're not miracle workers. There are some things you can't get done by calling Telecon so these types of requests must be sent to Plant Engineering." Frequently, the plant engineer, after receiving the request, will use Telecon to expedite the issuance of a work order instead of preparing a Plant Engineering Work Request which must be scheduled

according to workload and manpower commitments.

As to their customers, Ralph and Harold say, "We'd like to thank everyone for their cooperation because it makes our job easier. This is a busy place and sometimes only one of us is here to handle incoming calls. If we have to place your call on 'hold,' please understand. We'll take your request as soon as we can."

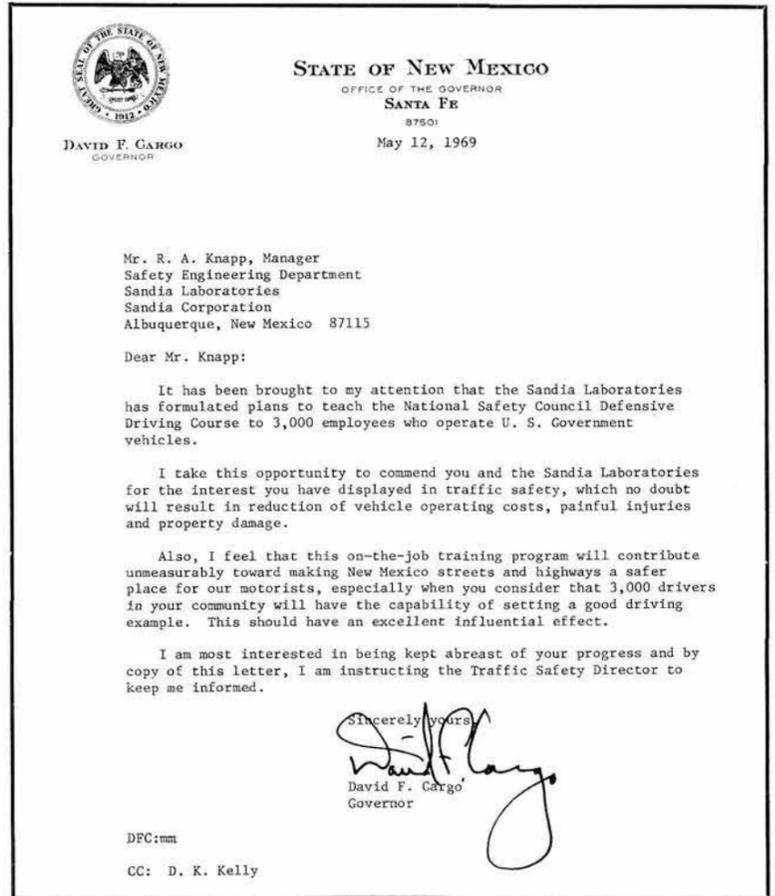
## Daril Gutscher Wins Table Tennis Championship

Daril Gutscher (1213) emerged the 1969 table tennis champion at Sandia Laboratories after the final round robin matches played recently. He teamed with Dwayne Mozey (1211) to take the doubles competition.

Second place in the singles event went to James Clark (7322) while George Ingram (5132) took third place.

In the doubles tourney, Eugene Chavez (7333) and Ernie Gurule (7332) took second place. Dave Newcomer (7321) and Gene Lucero (7351) placed third. Dave was also the tournament director.

In a special Class A competition, Keith Treece (2441) placed first and Ray Jones (9241) took second.



# Summer-Long Defensive Driving Courses Start June 2 for Sandians

A small group of employees is completing driver improvement training courses this month in preparation for teaching 3000 other Sandians a defensive driving course during the summer months.

The course was developed by the National Safety Council and will be given to all employees who hold Government driving permits. Al Banks of Safety Engineering Division 3351 is handling administrative arrangements. The New Mexico Traffic Safety Commission is the coordinating agency for the state.

Training for the instructors is being given by Walter Paxton (4614) and Kenneth Groves, Sandia Base safety officer. The first eight hours of training is the standard defensive driving course; this is followed by four hours of instruction in how to use the training aids (movies, manuals, etc.) which are furnished by the National Safety Council.

"Many of these employees are experi-

enced teachers already, so it's mainly a matter of learning the details of this particular course," Al explains.

Regular training classes will start June 2 with each course lasting two hours a day for four consecutive days. The group of instructors will be able to put 240 employees a week through the course. Sessions will be held in room 14 of Bldg. 632 and room 319 of Bldg. 360 (Sandia Base headquarters).

Six security lieutenants have already completed the instructor's course and have been giving the course to other security guards.

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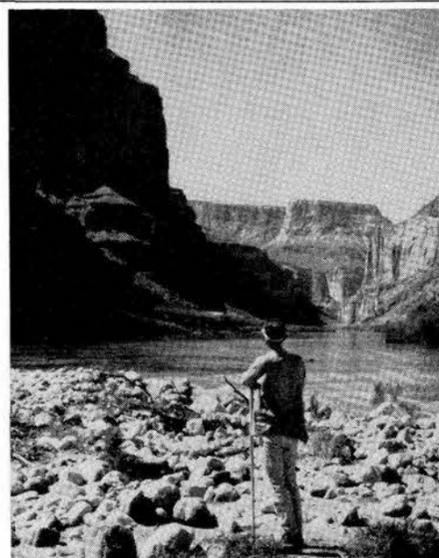
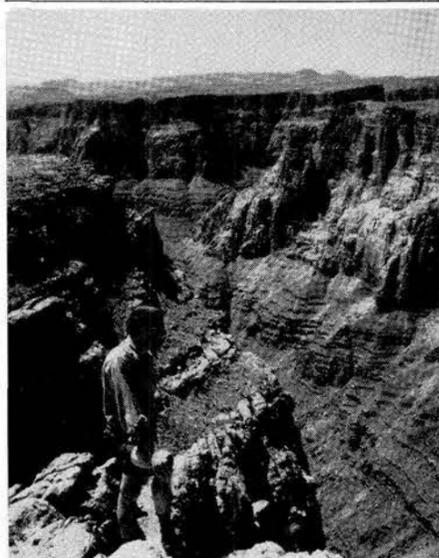
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**POPULAR SPOT** — The Grand Canyon is no place for the inexperienced hiker, nor is it a place to sprain your ankle 10 miles from transportation. Don Peterson (1711), left, had the accident near the bottom of Nankoweap Trail and it was six days and 25 miles later before he again reached the rim via the Little Colorado River and Salt Trail Canyon. George Steck (1723), shown viewing Kwagunt Creek, Don Mattox (5442), George Nakai (UNM), and Don's wife Adair shared the weight of Don's backpack on the long trek.

## SANDIA LAB NEWS

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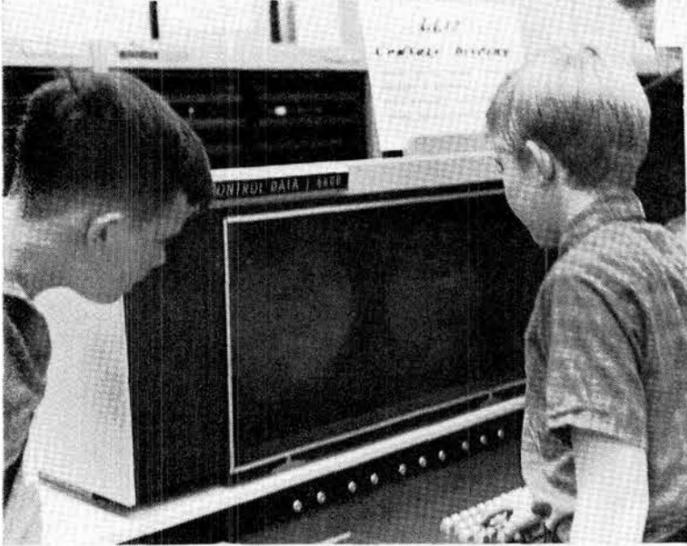
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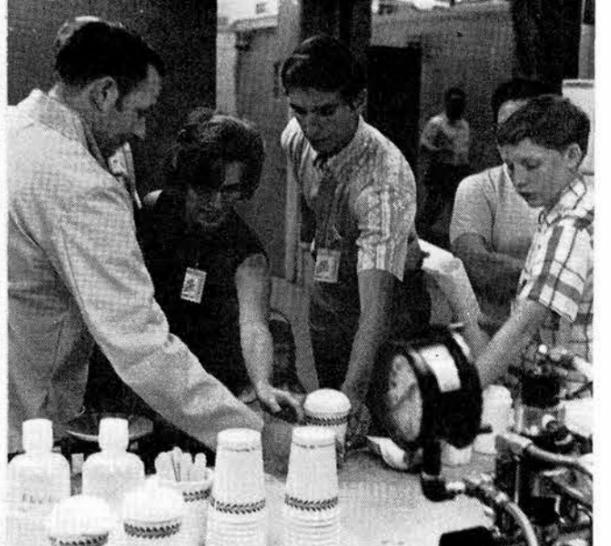
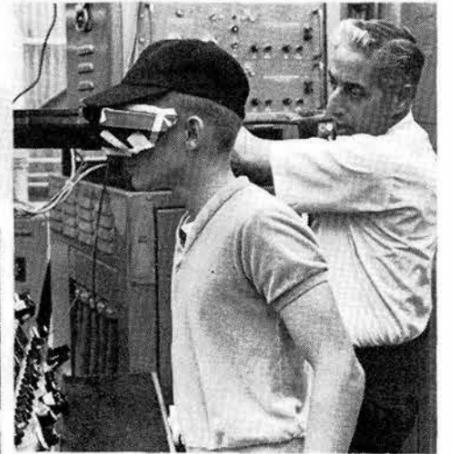
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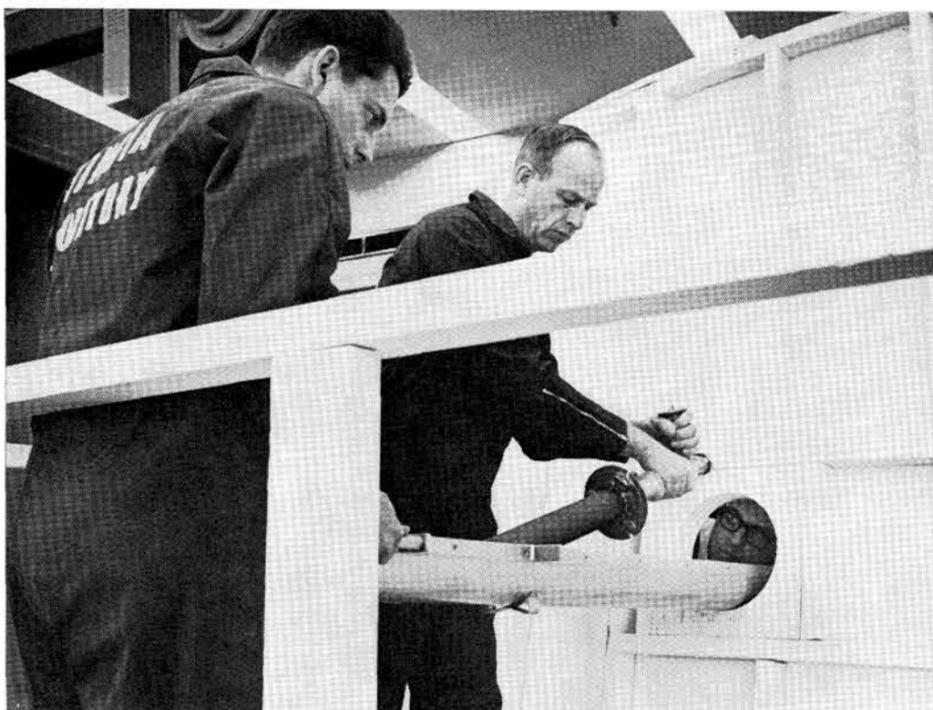


# Sandia Laboratories Livermore



## FAMILY DAY 1969





ON SATURN V MOCKUP, loading team members Bob Wemple (left) and Carl Sisson practice putting the plutonium 238 fuel capsule through the outer skin of the rocket. Tools, such as the hand grip and port entry trough, are specifically designed for the loading task. Al Stephenson is visible through the port.

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## Apollo Moon Program

well, the Sandia job takes about 20 minutes. There are more than 100 specific actions in the countdown procedure which the Sandians must complete in the loading task. These actions are under the direction of the AEC/ALO Project Coordinator and are double checked by a NASA quality control officer who observes the loading.

In the high bay area of Bldg. 892, there is a wooden mockup of the LM and a portion of the Saturn V launch vehicle where the men have practiced the loading operation to perfection.

The emphasis on perfection is typical of Sandia's involvement with the SNAP-27 generator. The system was developed under program guidance of the Space Nuclear Systems Division, AEC Headquarters, with the development contract administered by the Space and Special Programs Division of the Albuquerque Operations Office. Sandia is responsible for the technical direction of the program and for support of the safety aspects of the program. The Operational Safety Division is providing on-site assistance to the AEC Project Coordinator.

Jim Leonard is the project director who shares responsibility for the program's technical direction with Al Stephenson and Tom Harrison (all 9521). The safety activities are centered in Aerospace Nuclear Safety Department 9510 which oversees safety requirements for all of the SNAP devices.

Jim Leonard is also a member of the fuel capsule loading team along with Bob Wemple (9511), Carl Sisson (1543) and Bob Pace and Watson Snyder (both 7233 assigned full-time to man Sandia's Cape Kennedy facility). For the men on the team, the loading job is a secondary assignment performed only during Apollo launch activities.

Once placed inside its cavity in the SNAP-27 generator on the surface of the moon, the plutonium 238 fuel capsule's heat will be converted to 70 watts of electrical energy by a thermopile consisting of lead telluride thermocouples in the generator.

Seven scientific experiments plus a data subsystem will be powered by the generator for a minimum period of a year. The Apollo Lunar Surface Experiments Package (ALSEP) will provide the scientific community with an unprecedented knowledge of the lunar environment—especially in the areas of seismology, geology, geophysics, geochemistry, particles and fields. The data will have a major impact on the evaluation of contemporary theories of lunar evolution.

One of the most interesting questions to be answered by the ALSEP instruments will be whether or not the moon evolved in the same pattern as now believed for the earth. Also, is the differentiation (structural composition and stratas) that exists on the moon similar to that of the earth? The ALSEP instruments will provide a means of measuring the moon rock layers in depth.

Seismic instruments will record the degree of moonquakes (if they exist) and the range of meteorite impacts. One of the instruments is designed to discharge (on command near the end of the operational year on the moon) a series of mortar explosions which will provide an artificial

shock wave for the instruments to record.

Is the moon's core a remnant of a molten body formed during the same period as the earth? If the core does exist, and is hot, then is it sustained by insulating layers of its mantle and supplied heat by radioactive decay? The ALSEP heat flow experiment will determine the net flow of heat outward from the moon's interior and possibly answer these questions.

What kind of material makes up the moon's core? Precise measurements of the flow of the interplanetary magnetic field through the moon by an ALSEP magnetometer instrument will tell if the moon attracts or repels this interplanetary field. The data obtained from this experiment will aid in interpreting the composition of the moon.

It is possible that the lunar atmosphere is dominated by volcanic or other outgassing processes. Determining the amount, composition, and variation of the lunar atmosphere is the objective of another ALSEP experiment.

Interaction of the solar wind with the moon, as recorded by another ALSEP experiment, will provide an opportunity to study the effect of solar particles on the earth and the moon. The occasional violent outbursts of protons from the sun (related to solar flares) can be studied from the moon in ways not possible on earth because the earth's magnetic field acts as a buffer in repelling solar wind particles. On the moon, where the magnetic field gradient is significantly less, scientific measurement of solar wind particles with ALSEP instruments will be possible.

Particles sent out by the sun set up currents through the moon which can be

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## High Altitude Meteorology

used to diagnose the atmosphere's dynamic characteristics at considerably higher altitudes. Launched from Barking Sands Range in Kauai, a rocket payload released a liquid compound of trimethylaluminum (TMA) into the atmosphere which reacted with atomic oxygen to form a luminous cloud that could be photographed during certain hours. In earlier experiments, sodium clouds were also photographed during brief periods at sunrise or sunset.

Later, in a 1966 series, Larry employed the same technique with a Sandia-developed payload of triethylborane which allows more precise temperature measurements. The basic method is the determination of the temperature by spectroscopically analyzing the vibrational energy distribution of the boron oxide molecules which result from the chemical reaction with atomic oxygen in the atmosphere.

An additional technique consists in observing basketball-size spheres ejected from a rocket at altitudes of interest. The falling spheres are readily tracked by radar. From observation of their horizontal motion and rate of descent it is possible to derive atmospheric density and temperatures up to altitudes of 330,000 feet and winds up to 230,000 feet.

Currently, Larry is working on a method



PROTECTIVE GRAPHITE CASK, mounted outside the LM, will hold the SNAP-27 fuel capsule while traveling through space. Al Stephenson, right, and Jim Leonard practice installing the fuel and securing the dome on the cask. Loading the fuel is performed at T minus 15 hours in the Apollo countdown procedures.

detected by the ALSEP solar wind spectrometer. The characteristics of these currents will aid in determining the conductivity of the moon. This data, combined with an analysis of the lunar magnetic properties, should give additional insight to the composition of the moon as a whole.

Project Apollo is under the direction of the National Aeronautics and Space Administration (NASA). Bendix Aerospace Systems Division is the prime contractor for the design, integration, test and systems management for the ALSEP package with scientific advisors from a variety of institutions and agencies.

The SNAP-27 program is conducted by the AEC's Albuquerque Operations Office with technical direction by Sandia Laboratories. General Electric Company's Missile and Space Division is the prime contractor. Mound Laboratories produces the plutonium fuel.

to improve the present inflatable falling sphere system. By installing an accelerometer and transmitter in the sphere he will be able to obtain more accurate temperature and density measurements up to altitudes above 400,000 feet.

Larry sees the satellite as the source of much of the future knowledge about the mesosphere and surrounding regions. Although satellites orbit well above these heights, sophisticated on-board instrumentation can "look down" through the atmosphere with infrared or other measuring techniques and then relay information to ground stations.

Still, the mesosphere today remains largely unknown — a vast sea through which man passed but did not chart on his great voyage to the moon. In spite of increased amounts of data in recent years from high altitude meteorological studies, much of the phenomena remains scientific mystery: What, for instance, is the mechanism by which the atmosphere is heated during geomagnetic storms? What are the effects of high altitude winds, pressure and temperature on surface climatic conditions?

These are just a few of the questions confronting Larry and his colleagues in their effort to nurture the fledgling science of high altitude meteorology.

## Ronald Husa Invents Versatile Generator



A patent for a "triggered volt-second generator" has been issued to the Atomic Energy Commission in the name of Ronald Husa of Timers Division 2326. The generator circuit produces a constant volt second area

pulse which may be employed for driving magnetic counting circuits on missiles and is also suitable for use as a driver for magnetic shift registers.

A unique feature of the circuit is that it is independent of the shape and duration of the input pulse. Prior circuits relied on rectangular-shaped input pulses for triggering or else the duration and amplitude of input pulses had to be constant.

Some other features of the circuit are that it is capable of high efficiency operation and its components do not have to maintain a close tolerance as was true with earlier devices designed to accomplish the same result.

## Bruce Van Domelen On Nuclear Compact



Governor Cargo has named Bruce Van Domelen (100) to serve as New Mexico's representative on the Western Interstate Nuclear Compact (WINC).

The state legislature recently passed legislation enabling

New Mexico to become a member of WINC. The compact is an attempt to aid the 13 western states in commercial and industrial progress "through the proper employment of scientific and technological advances in the nuclear and related fields." Federal legislation for financial and administrative support remains to be passed.

Bruce was appointed chairman of the governor's Scientific Advisory Committee three years ago and has been a representative to the Committee on Western Interstate Nuclear Compact, the founding group.

## Sharpshooters Win Two Places in Tourney

Two teams of Sandia sharpshooters placed second and third in a recent tournament in competition with five Sandia Base teams. Sandia Base Element took the championship.

Sandia Laboratories' second place team was composed of Curt Moses (1548), Ken Novotny (2442), Mac Weaver (7652) and Dave Overmier (9122).

Third place team members were Al Rizoli (7432), Baron Brumley (2316), George Edgerly (4221), Buzz Milton (5443), Jim Bluett (7331) and Ednae Gross (3311).

## Deaths



Elmer Ford

Guy Wilson

Elmer Ford, a staff assistant in Electronics Components Division 2632, died May 7 after a short illness. He was 59.

He had worked at Sandia Laboratories since August 1949.

Survivors include his widow and two sons.

Guy Wilson, a staff associate in Radiation Effects Division 2635, died May 12 in an automobile accident. He was 52.

He joined Sandia Laboratories in June 1952.

He is survived by two daughters and two sons.

## Sandian, Wife Aid Patients

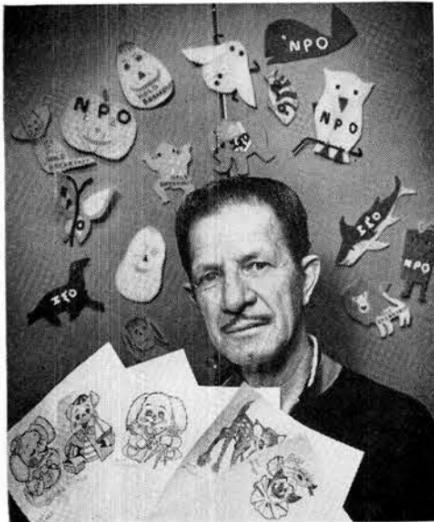
When Glen Wisner (4542) was hospitalized for an operation a couple of years ago, he made some personal stationery with caricatured letterheads to while away the time. A nurse admired his work and asked him to do some sketches for the hospital. Since that time, Glen and his wife, Dorothy, have put in about 45 hours a week between them doing auxiliary work for the Presbyterian Hospital.

Glen draws political caricatures on stationery for adults, and animal pictures for the children which they can attach to their beds. During the 15 hours or so Glen puts in at the hospital every week, he also visits with all new, out-of-town patients who may not have friends or relatives in the area. "I pay particular attention to Medicare patients, many of whom are becoming senile and need attention as much as children," Glen says.

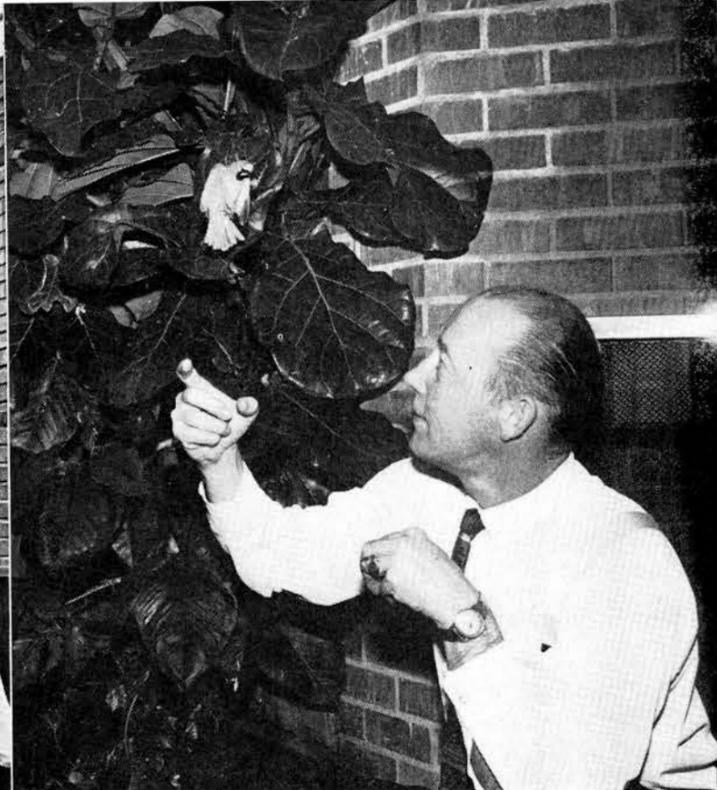
Mrs. Wisner works in what is known as the "call service" in which persons in civilian clothes greet new patients and accompany them to X-ray rooms or other testing facilities. The purpose of the service is to put new patients at ease by minimizing the institutional atmosphere.

Following his retirement in July, Glen and his wife plan to go to Arizona where they will work with the Indians at either the Papago or the Sacaton Reservations.

"We will be in the settlements during the week doing vocational education work and on weekends we will work in a hospital," he said. Glen will also be giving inhalation therapy and has been preparing himself for this by taking a four-month course in "Intermittent Positive Pressure Breathing" at the Veteran's and Bataan Hospitals. The therapy is designed to aid persons suffering from respiratory diseases, to which Indians appear to be unusually susceptible.



CHEER for sick children is brought by Glen Wisner (4542) and his wife who work many hours each week in the Presbyterian Hospital. The couple makes foam rubber toys and pictures for patients and does other work to ease hospital confinement. Following Glen's retirement in July, they will work on Indian reservations.



COMING IN FOR A LANDING on Luke Vortman's finger is a gold-fronted chloropsis from Asia, one of many imported tropical birds in Luke's aviary.

LEFT —

WHERE ARE THEY? This indoor jungle in Luke Vortman's home provides a perfect hiding place for more than 50 tropical birds. Papaya and fig tree thrive equally well with cacti in this completely enclosed patio. Fireplace and fountain are other features of this unusual outdoor/indoor room.

## Letter to an Editor

# Luke Vortman--These Birds Turn Him On

Dear Boss:

You may have noticed in earlier issues of the LAB NEWS that Luke Vortman has always been a pretty good news source. His work in Underground Physics Division (9111) is interesting and the explosions, which are an integral part of his cratering studies, are usually spectacular from a photographic viewpoint. You can always identify Luke in the photos because he wears wide suspenders—none of this beard stuff for him.

Off the job, Luke pursues interesting hobbies — things that make good LAB NEWS feature stories. But sometimes we have a problem.

Luke has a noteworthy collection of cacti. Now to most people, a cactus is something small with lots of sharp needles, or it's something large and dramatic against the sunset, a la *Arizona Highways*. So we went to do a story (with pictures) on Luke's cacti. He told how difficult it was to locate a particular variety. "Okay," said I, "let's take a look at this species." "You're looking at it," he replied. So I got down on my hands and knees. The gravel still looked like gravel, only some rocks were larger than others. No needles. "The larger pebbles, those are the cactus," Luke said. Another variety looked like lengths of rope hanging from a flower pot. One fuzz ball looked like it should be knit rather than grown.

Another year Luke enclosed his patio—not just on four sides, as most people do, but also across the top. He added a small waterfall and lots of tropical plants. It sounded great, only all the plants were

green and on black and white film they were just a dark blur. Luke had just solved a pesky problem: aphids and other small insects were multiplying at an astounding rate and to fight them, Luke imported a large quantity of ladybugs. Ever tried to photograph a swarm of ladybugs?

Then several years ago, a visiting zoo director remarked to Luke that the patio would be a delightful place for small birds. "It was so delightful," Luke says, "that I'm still adding birds." Once again, it sounded like a fine idea for a feature story with pictures. Photographer Bill Laskar visited Luke's aviary hoping for dramatic pictures of exotic species, but the bird-brained creatures wouldn't stand still long enough, and it's pretty hard to shoot one on the wing.

Later I asked Luke about his birds. He told me he has about two dozen species from South America, Asia, Africa, and Europe. Some birds are selected for their color, some for their song. The majority are ordered from importers in Chicago, Florida, or on the West Coast. If the species breeds well in captivity, Luke often tries to get a pair, "but zebra finches from Australia are so prolific that they would take over the place if I let them," he says.

Once a year he purchases a standard finch mix for the seed eaters. The "soft bills" are fed fruit, honey and water, but bread and milk is a special dish that appeals to all. Brazilian cardinals are unusual in their eating habits: the adult birds are seed eaters, but the young birds are fed live food and later adapt to seeds.

The different types of birds get along

very well, but Luke points out that he avoids aggressive species (such as thrushes). Judging from their song and bright plumage, the birds are thriving in their 15 x 40-foot home. Luke still has the first bird he ever bought (it must be six or seven years old), and he also has several birds whose feathers are turning grey or white with old age. "You never see that in nature," Luke says, "the birds don't survive that long."

Some of Luke's other hobbies are pretty interesting too—but what say we just stick to his cratering studies?

Your Staff Writer, Cherry

## Take Note

Two Sandians were AEC Special Awards Judges at the 20th International Science Fair held in Fort Worth this month.

Ted Sherwin, manager of Public Relations Department 3430, and Albert Narath, director of Solid State Sciences Research 5100, were among representatives from AEC headquarters and the various AEC laboratories who selected the 20 outstanding exhibits related to nuclear science or its applications. Awards to the top 10 winners and their science teachers were an expense-paid "Nuclear Research Orientation Week" at Argonne National Laboratory in August.

The exhibits were judged on creative ability, scientific thought, thoroughness, skill, clarity, and dramatic value.

This was the eighth international fair at which the AEC had presented these special awards.

\* \* \*

Crawford MacCallum (5231) and Richard Rudolph (9223) are among employees whose children are enrolled in the Albuquerque Pre-School Cooperative.

Registration for fall term is now being taken by Mrs. William McKinstry, tel. 299-6393, for children ages three to five. The school (at 2028 San Mateo NE) employs professional teachers, but all of the parents assist the school in some way — some are teacher aides, others help with maintenance or administrative duties.

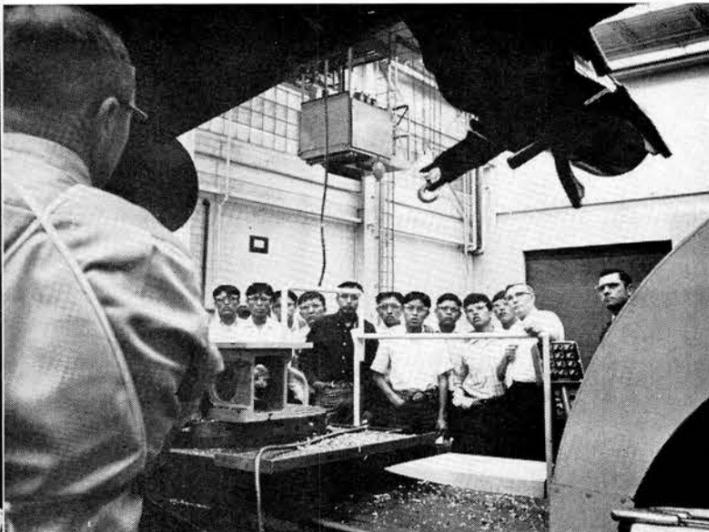
At the present time, 33 children are enrolled. The school hopes to expand to double that number in the fall to make better use of the facilities. A fund drive is underway to provide 12 scholarships.

\* \* \*

Mary Harrison (3255) was re-elected to the Board of Directors, Southwest Institute of Personal and Organizational Development, at the annual meeting held near New Orleans the weekend of May 9.



FROM THIS TO THAT—Ray Parker (4251) explains to a group of Navajo Indian students how the punched tape (left) is fed into the numerically controlled Sunstrand five-axis machining center (right). The youths were among 44 industrial arts students from the Bureau of Indian Affairs Ft. Wingate High



School who toured Sandia's General Machine Shop this past week. The group visited the Numerically Controlled Machining area, the Apprentice Machine section, and the Electronic Apprenticeship section. Machine operator on the right is Donald Bunten (4251).

## Retiring



Walt Kurlfink, a machinist in Project Shop 4252-2, will retire May 30 after more than 17 years with Sandia. Mr. and Mrs. Kurlfink will continue to live in Albuquerque at 313 Gen. Bradley NE. They have a married

daughter living in North Carolina and three grandchildren.

"The nice thing about retirement," Walt says, "is I don't have to make any definite plans. We will just come and go as we please. We have a camping trailer and like to fish. Now we can stay as long as we like."

Walt says he also has plans to work around his house and will be at home much of the time.

## Speakers

H. O. Pierson (5412), "Carbon Composites from Wool Felt Substrates," 2nd International Conference on Chemical Vapor Deposition, May 10-15, Los Angeles.

M. E. Morris (1742), "Production of Aerosols of Viable Particles of Different Sizes," American Association for Contamination Control 8th Annual Technical Meeting, May 22, New York City.

R. E. McCallum (7452), "Detection of Shifts in the Values of Saturated Standard Cells Used as References," 1969 IEEE, Ottawa Section, and Instrumentation and Measurement Group Symposium, May 5-7, Ottawa, Canada.

M. M. Sluyter (9343), "Tensor Conductivity Effects in Plasmas," University of Oklahoma graduate seminar, April 29; "Integral Techniques with Three-Dimensional Boundary Layer Flow," University of Notre Dame graduate seminar, April 30.

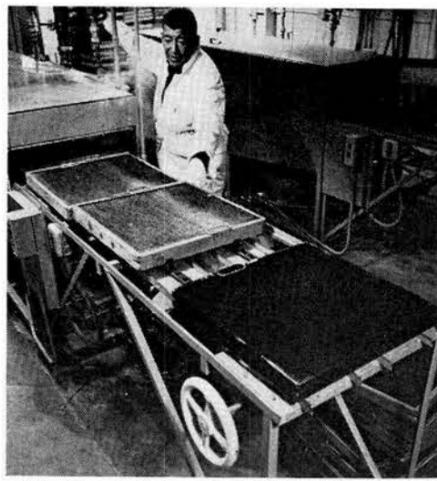
A. D. Swain (1642), "Human Factors Engineering," American Society of Certified Engineering Technicians, May 26, Albuquerque.

R. T. Meyer (5271), "Energy Transfer and Other High Density Effects Associated with Pulse Vaporization in a Time-of-Flight Mass Spectrometer," 17th Annual Conference on Mass Spectrometry and Allied Topics, May 18-23, Dallas.

A. R. Champion (5131) and R. W. Rohde (5133), "The Effect of Shock Stress Amplitude and Duration on the Hardness of Austenitic Manganese Steel"; R. L. Park (5441) and J. E. Houston (5442), "The Characterization of Chemisorption of LEED," Spring Meeting of the American Institute of Metallurgical Engineers, May 12-15, Pittsburgh.

D. M. Garst (1742) and H. D. Sivinski (1740), "Contamination Control: Serendipity or a Discipline?" Eighth Annual Technical Meeting of the American Association for Contamination Control, May 21, New York City.

W. D. Burnett (3311), "Retinal Burn Hazards from Chemical Explosions"; L. W. Brewer (3311), "Sandia Environmental Health Activities," Western Electric Meeting at the American Industrial Hygiene Conference, May 12, Denver.



Into the steam cabinet . . .



Exit clean . . .



Excess water extracted by spinning . . .

# Division 4574 Cleans 45,000 Filters Annually

The men who keep Sandia Laboratories clean — personnel of Janitor Services Division 4574 — do a number of important jobs, mostly at night. One of their unseen labors keeps the air in Sandia buildings fresh and free of dust. They continually change and clean the wire mesh filters in the ventilation systems.

According to the schedule, the filters are changed as often as once a week and at least once a month. The

filters are steam cleaned, dipped in a 190° oil bath and spun dry, leaving only a residue of oil to trap dust particles.

The men average 45,000 filter changes annually.

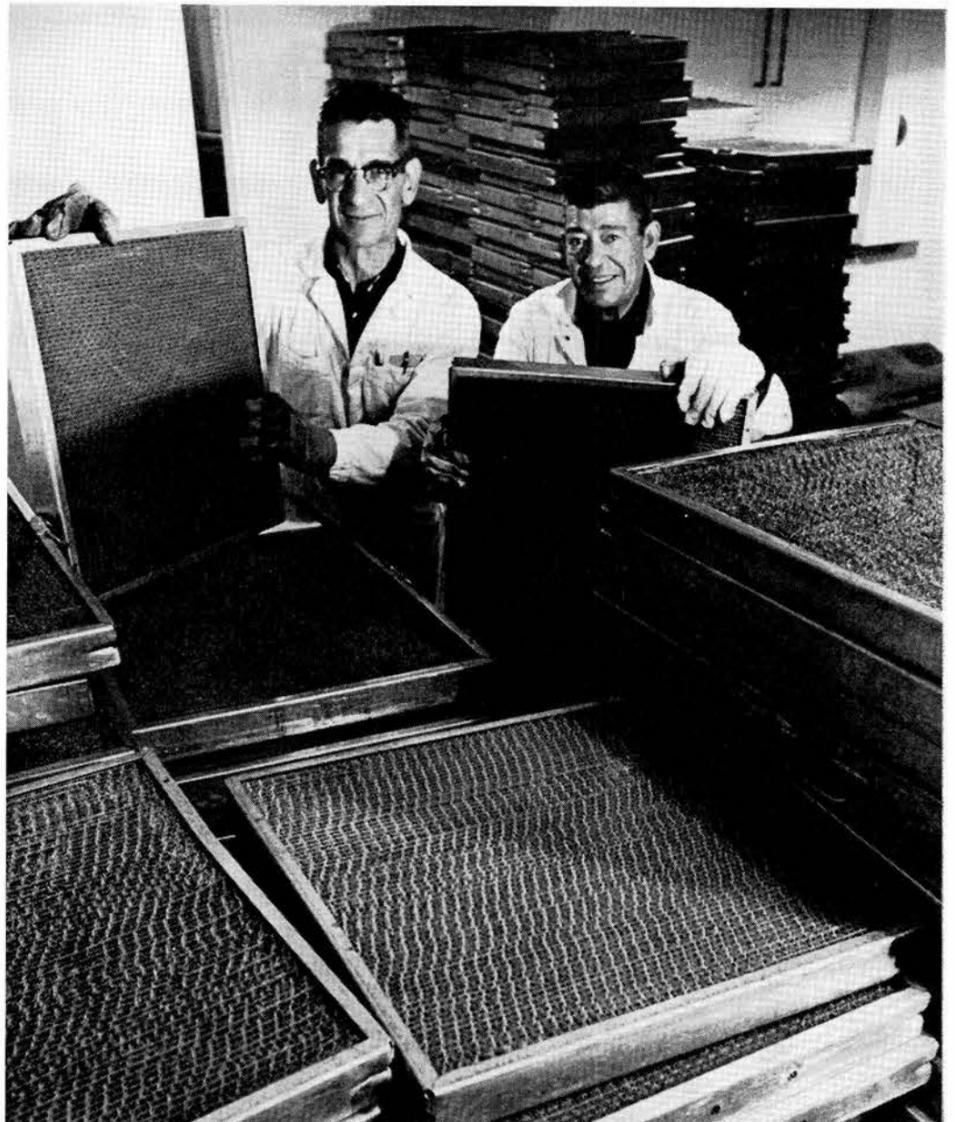
Persons who rotate the assignment are Santiago Anaya, Frank Armijo, Lawrence Montoya, Monico Martinez, Trinidad Montano, M. T. Hodge and Fidel Gonzales.



Into the oil bath, then spin again . . .



Edges wiped dry . . .



Santiago Anaya and Frank Armijo — "It's all in a night's work."

# Medical Director Explains 'Oh My Aching Back'

by S. P. Bliss

Sandia Laboratories Medical Director

Pain in the lower back is, unfortunately, one of the most frequent of mankind's ills (that is, ever since he assumed the upright posture). The problem may range from "a little stiffness when I wake up in the morning" through various forms of arthritis, to the sometimes intractable disc difficulties which may require surgery.

Some of the causes of back symptoms seem mysterious and not at all obvious; for example, pain in the back can be secondary to a prostatic problem, or various diseases of the pancreas, or gall bladder disease or peptic ulcer. But these causes are unusual, present with other more specific symptoms, and really do not present a diagnostic problem to your doctor.

It's the structural back problems that are a pain. Briefly, the spinal column is a bony structure surrounding and protecting the spinal cord and the nerves that issue from it. In order to allow for such motions as twisting, turning and bending, the spinal column is not one rigid single bone but, rather, is made up of a bunch of bones stacked up on each other, separated by a

pulpy cushion called the intervertebral disc.

This entire structure is enclosed by ligaments which help stabilize it while not interfering with its mobility. Further stabilization is provided by the large surrounding muscles whose contractions are responsible for our bending or moving in various directions. Usually it's some affliction in one of these structures—bone, disc, ligaments or muscles—that is responsible for low back problems. For example, arthritis of the bones can cause overgrowths of bone that encroach on the nerves as they branch out from the spinal cord, and the pinched nerve then causes pain.

Or there may be a fracture of a vertebra causing nerve pressure. An unusual, sudden, imbalanced muscular effort can cause the back to "go out" temporarily until the resulting muscle spasm is relaxed. A weakness in a ligament can result in the bulging of a disc to the point where the disc may not only protrude but may even pop out, a condition that may need surgical correction. In spite of the cause there are things one can do to help a low back

problem get better or to help keep it from recurring, or to prevent one. For acute problems your doctor may give you medicine ranging all the way from aspirin (which many physicians still consider the best medicine for a structural low back problem) to newer, more powerful drugs; he can also prescribe various forms of physical medicine such as heat lamps, diathermy, traction, back exercises, etc.

Once the acute problem has subsided, however, there are some things a person "with a weak back" should remember. Generally, persons with back problems should not do too much standing; when they are standing or walking they should walk with feet straight ahead, letting most of their weight come down on their heels rather than the balls of their feet. This is why women with back problems are usually told not to wear high-heeled shoes. When walking, walk with the chest up and out.

Many persons have the idea that it's good for the back, when sitting, to sit stiffly upright with shoulders thrust back, emphasizing the curve in the back. This is wrong. Persons with back problems are

urged to learn to live as if they did not have a hollow in their back—when sitting, standing, or walking.

When sitting they should, if possible, sit with knees higher than hips (thus minimizing the hollow in the back). Even when sleeping they should sleep with one or both knees drawn up, whether on their backs or their sides. (Incidentally, beds of people with back problems should be firm.) When standing they should not bend backwards.

Finally, such persons are advised to pay special attention to the way they lift things. Always squat when lifting, never bending forward to lift with knees straight (this applies to healthy backs as well). Lift with the arm and leg muscles, not the back muscles. Do not lift any significant weight above the waist line for, in doing so, the upper part of the body is arched, producing a hollow in the back. Carry the load close to the body, keeping the back as straight as possible.

These are some of the things to do for a back problem. Also available are specific back exercises that your doctor can review with you—exercises which will help strengthen the back muscular alignment.

## 25 Years



Bob Henderson  
2000

## Service Awards

### 20 Years



Bryan Arthur  
1640



Eliseo Chavez  
2633



Francis Cunningham  
8331



Johnnie Garcia  
4612



Laurence Hall  
7637



Clarence Muchow  
7431



Leroy Stradford  
1525



LaRue Wildgoose  
4615

### 15 Years



Wilson Brown  
9225



John Budlong  
7321



Samuel Cummins  
8171



Fred Drummond  
4231



Dale Hanely  
4211

### 10 Years

May 23 - June 5

Gordon Bennett 8233, Rose Gonzales 7631, Leon Maschoff 7216, Herman Von Steeg 8223, Lawrence Nelson 9232, and Robert Stinebaugh 9133.

## PAGE SEVEN

## SANDIA LAB NEWS

MAY 23, 1969

## Three Factors Contribute Heavily to Heart Disease

If you're overweight, have high blood pressure, and smoke, chances are your life will be foreshortened by fatal coronary heart disease.

Scientists at the National Heart Institute in Bethesda, Md., have reviewed the health records of 50,000 former students of Harvard University and the University of Pennsylvania. They were interested in how the three above mentioned health factors relate to coronary heart disease in the 24-44 and 45-64 age brackets.

In both age groups, the combination of any two of all three characteristics more than doubled the risk of fatal coronary heart disease. Smoking alone (10 or more cigarettes per day) increased the risk of a fatal attack by 62 percent. High blood pressure alone (systolic blood pressure of 130mm of mercury or more) increased the risk by 58 percent, and overweight alone increased the risk by 33 percent.

## Events Calendar

May 24-25—Albuquerque Rose Show, Floriculture Building, State Fair Grounds.  
May 29-June 4—Indian dances, Tesuque Pueblo.

May 30-June 1—N.M. Mountain Club backpack trips: Mora Flats in the Pecos Wilderness, leader Don Peterson, tel. 299-4714; Blue River primitive area, leader Milo Conrad, tel. 298-2989; Gila Wilderness, leader Ray Nethers, tel. 344-8437.

June 6—June Music Festival, Albuquerque Little Theatre.

## Congratulations

Mr. and Mrs. Leonard Hansen (5112), a daughter, Dilynne Rae, May 6.

Mr. and Mrs. Douglas Robertson (4137), a daughter, Heather, May 12.

Mr. and Mrs. Filimon Tenorio (9411), a daughter, Valerie Ann, April 26.

Mr. and Mrs. Robert Davis (7342), a son, Robert Arthur, April 13.

Mr. and Mrs. Jim Menzel (3411), a son, Dmitri Jungman, May 9.

## Sympathy

To L. K. Renfro (4574-2) for the death of his mother in Jasper, Texas, May 14.

To Seferino L. Sanchez (4574-3) for the death of his father-in-law in Jarales, N. M., May 9.



**FISHING IS GREAT at Johnston Island.** Witness this record 878-lb., 12-foot 4-inch tiger shark caught by four airmen stationed at Johnston. Jim Murray (4612), who witnessed this record catch, was convinced that Moby Dick had finally been landed. Although the waters around Johnston Island abound with the smaller sand shark, this is the first recorded catch of the tiger variety. The airmen caught the shark on a parachute cord with a wire leader. It took 1 1/2 hours and two trucks to land the creature. So, if you'd like to catch a big fish, go to Johnston Island. Only one problem—where do you find those giant worms?

## SHOPPING CENTER

### CLASSIFIED ADVERTISING

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

#### RULES

1. Limit: 20 words
2. One ad per issue per person
3. Must be submitted in writing
4. Use home telephone numbers
5. For Sandia Laboratories 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

#### MISCELLANEOUS

- BIG BOY barbecue w/motor, \$25; 1 set ladies golf clubs w/bag & cart, \$30. Spencer, 298-5061.
- TIRE, 5:20-5:60x12, \$15 or best offer; child's expanding door gate, \$1.50; stroller, \$10; evaporative car cooler, \$12.50. Christiansen, 298-2658.
- SKI BOAT w/new Johnson 33hp motor, trailer & ski equipment, \$600. Lewis, 268-3835.
- CEMENT MIXER, 3 cu. ft., Sear's model, cast iron drum, 925 engine, \$125. Hobart, 282-3983.
- KLIPSH style speakers, one complete, one bass unit only, changer, tuner, amplifiers, 16" turntables, stereo pickups, arms, \$300. Palmer, 344-5342.
- HAND MOWER \$10; 5-burner gas stove, \$45; portable cooler, \$8; 6' patio umbrella, \$10. Navratil, 299-3355.
- ARTLE FLUTE, heavy silver plate, \$80. Fisher, 265-0626.
- FENDER AMP-guitar & case, for student or beginner, used 2 times, paid \$150, sell for \$90. Burns, 268-1306.
- WASTE KING built-in dishwasher, it works, \$20; trade boy's 24" Schwinn bike for girl's bike or sell for \$12. Hunnicutt, 299-2932.
- RANCH OAK sofa, \$119; modern floor lamp, \$10; flexsteel sectionals, \$49. Winblad, 344-3109.
- WATER SOFTENER, Sear's model, about 18 mos. old, auto. cycling for back flushing the tank, other features. Bartlett, 299-4861.
- VANITY, 6-drawer, w/mirror, \$20; TV, Westinghouse 19" portable, \$45. Grimsley, 268-1427.
- '64 NEW MOON TRAILER, 10x50, expanded living rm., \$3500. Zimmerman, 898-2004.
- METAL rabbit cages w/auto. feeders & water, 25 units, \$75. Shoemaker, 1-865-9809.
- COUCH, brown, 96" long, \$40; sewing machine, Sear's, \$25; table, metal & formica, 30x48, \$15. Nagel, 298-2779.
- 24" GIRL'S bicycle, \$3. Pollard, 299-1318 after 6.

- '68 HONDA 350 scrambler, \$895; 2 7:00x16 6-ply tires w/heavy-duty wheels, for 1/2-ton Ford, \$20 ea. Trujillo, 256-3840.
- '68 SUZUKI 200cc scrambler, 4000 miles, \$450. Irving, 299-0664 after 5:30.
- ENCYCLOPEDIA AMERICANA, set of 30 volumes plus 18 annuals through 1968 & 2-vol. dictionary, \$75. Bodenhamer, 877-1225.
- FREE KITTENS, six wks. old, fluffy long hair, 2 calico, 1 dark grey, ready to take home. Lynes, 268-0144.
- ACCORDION, Enrico Roselli w/case, 120 base, 2 shifts, \$200. Phillips, 265-0296.
- BASSETT PHOUNDS, AKC reg., 8 wks. old, \$75-\$150. Craner, 296-2005.
- MAC 45 2-cy. engine, 6 cu. in., 9 ported w/Go-Kart clutch. Lenz, 298-3872.
- BICYCLE, boy's or girl's 20", coaster brake, \$10. Esterly, 256-9251.
- TOY POODLE-CHIHUAHUA cross puppy, 8 wks. old, female, \$30. Sutton, 298-0001.
- USED metal swimming pool, 3' x 12', electric filter included, \$70. Fears, 256-3956.
- DOUBLE BED, \$25; stroller, \$10; 2 men's bowling balls, make offer. Husa, 298-3335.
- SCHWINN Varsity 10-spd. bicycle, paint is original metallic purple, \$50. Hoff, 255-5915.
- GERMAN SHEPHERD PUPPIES: guard, scout, patrol & mostly family loving dogs, 9 wks. & older, \$100 and up. Villella, 298-7955.
- POOL TABLE & wall rack, \$55. Metzgar, 242-1028.
- MATTRESS & matching box springs, Spring-Aire, full size, \$35. House, 265-4668.
- TENOR BANJO w/case, \$45. Jefferson, 299-1125.
- NIKKOREX 35m camera, 43-86mm f3.5 zoom lens, built-in cross-coupled lightmeter, carrying case, factory reconditioned, \$105. Knox, 255-3145.
- BEDROOM SUITE dresser, twin beds, desk, chair, box springs, two Simmons mattresses, \$150; 2 pr. full length drapes, \$25. Brown, 255-0566.
- CHILDREN'S swing set, \$5. Gurule, 344-0130.
- MATCHING DRAPES for sliding door & picture window, bold black, white, gold print, cost \$287, sell for \$75. Grimes, 265-6234.
- FULL FAIRING for BMW motorcycle, \$45; 9:00x 15 tire & wheel, \$7; '55 Cad, 69,000 miles, \$290. Shunny, 265-1620.
- 2 WIGLETS, light blonde human hair, hand tied. Hall, 268-6387.
- REGISTERED HALF ARAB mare, well behaved, trained western, \$350 for mare, saddle, bridle & pad. Cockleiras, 898-3106.
- APPLIANCES: furniture; electronic organ; lawn equipment; garage sale, Sat., May 31 & Sat., June 7, 903 Lamppost Circle, Four Hills. Hughes, 299-6674.
- AKC REG. tiny toy poodle puppies, 7 wks. old, silver male, silver beige male, excellent pedigrees. Davis, 298-1957.
- GARAGE SALE: May 22-24, 1909 Dakota NE, music stand, window fan, room cooler, bar stool, books, patterns, puzzles, games, bowling ball, bag & shoes, etc. Yingst.

- FOUR DRAWER CHEST: student desk, chair, light solid oak \$100; water pump, quarter horse Jacuzzi, \$18. Toya, 898-0491, 125 El Pueblo Rd. NW.
- TURNTABLE w/stereo tone arm, built-in strobe for 33 1/3, 45, & 78 rpm, & infinitely variable speed control, \$30. Smith, 299-6873.
- MOTORCYCLE, '66 Yamaha 125cc, \$150; clothes-line posts, 1 1/2" pipe, \$7. Sparks, 898-0491.
- FLUTE, Buffet Evette, w/case, \$65. Plage, 255-1801.
- FREE KITTENS, born in Tech Area. Wheelock, 255-1373.
- FENDER guitar, amplifier, twin reverb, Altec Lansing speakers, \$500; mike stand, \$10; 1/2-ton utility trailer, stake sides, \$65. Shock, 877-3728.
- SWIMMING POOL, 8'x18", 2 yrs. old, \$8. Bassett, 898-1840.
- BATHROOM FIXTURES, Campbell, 299-4830.
- GARAGE SALE: 12:5 Sat. & Sun.: dishwasher, vacuum cleaner, lamps, camp stove, ice cream freezer, misc. 7108 Osuna NE. Spray, 299-0412.
- IRRIGATION PUMP, 1 1/4" input w/1/2hp motor, all fittings for 2" well incl., \$25. McAvoy, 1-636-2223.
- TENT CAMPER TRAILER, Apache Golden Buffalo, sleeps 6, has dinette, sink, butane stove, icebox, toilet, carpeting, spare tire, closed 6x8' open 6x16', can be pulled by small car, \$850. Fox, 299-9332.
- REFRIGERATOR-FREEZER, 13 cu. ft., Hot Point, 2-door, white, \$85. Howard, 256-2525.
- TIRE, 7.75x14 Firestone, deluxe champion, never used. Bopp, 299-2360.
- BATHROOM FIXTURES: lavatory, water closet, 2 ea., grey & green, plus other items, under 1/2 cost. Browning, 299-6384.
- REAL ESTATE
- TWO residential lots NW Valley, Decker NW, will sell both or separately. Sanchez, 345-1945.
- 3-BDR., 1 1/4 baths, 1675 sq. ft. Roberson, oak floors, entry hall, lg. backyard, landscaped, paneled den, pantry, 5/4 loan, \$125/mo., \$17,950. Zimmerman, 296-1058.
- PITCHED ROOF, 4-bdr., cfa, AC, tiled 1 1/4 baths, built-ins, carpeting, drapes, \$2000 down, 1922 Venus Ct. NE. Gallegos, 299-7270.
- 4-BDR., 2400 sq. ft., lg. den, built-ins, corner lot, FHA appraisal \$20,450, 600 Dakota SE, move in July, Padilla, 256-0701.
- LOT, located among new homes near Eubank & Comanche, \$3975 includes paving & utilities, reasonable terms. Fligner, 265-2665.
- 3-BDR., pitched roof, carpet, AC, facing Wade Park, near Base, assume 5/4% G.I. loan, \$2400 equity, \$85/mo. Nelson, 344-9961.
- BRICK HOME, walled dbl. lot, huge living & sun rooms, 3-bdr. & baths, den, hot water heat, white carpeting, \$54,000, \$21,000 down. Garner 255-3403.
- PURCHASE EQUITY, assume 5/4% loan, Roberson 3-bdr., 1 1/4 baths, oversized dbl. garage, many extras. Thompson, 3421 Britt NE, 298-0946 after 6.

- MODERN 2-bdr. log cabin, recreation facilities available, located 14 miles east of Taos, N.M. Crawford, 299-0260.
- 4-BDR. Colorock, FP, FR, 1926 sq. ft., close to schools & Base, \$19,000. \$7200 equity or refinace w/\$2800 down. Summer, 299-1912.
- NE HEIGHTS, 3-bdr. Roberson, 1 1/4 baths, lg. corner lot, \$2500 equity, will consider real estate contract. Glaze, 299-7832.
- EDGEWOOD, 5 acres, lg. 3-bdr., pitched roof, wb-fp, utility rm., dbl. garage, fruit trees, \$16,500, low interest & mo. payments. Browne, 344-6343.
- 4-BDR. & Den, was Mossman's total electric model, L-shaped LR, DR, private patio, available July 3, assume 6 3/4% Tuler, 298-2685.
- TWO suburban home sites 5 acres each, one in Placitas, one in Hts., clear titles. Crosley, 898-0705.
- 3-BDR., 1 bath, carpet, drapes, built-ins, AC, pitchroof, pay equity of \$2700, assume payments \$94 at 5 1/4%. Johnson, 11616 Copper NE, 299-1716.
- CARS & TRUCKS
- '54 CHEV. PICKUP, 4-spd. trans., \$325. Silva, 298-8039 after 6.
- '64 CORVAIR Monza convertible, 4-spd., \$650; '59 El Camino, 283, AT, Rex, 298-1055.
- '61 PONTIAC conv., power, \$450. Lundergan, 255-2974.
- 11' CHASSIS MOUNT custom camper, 1-ton Ford truck, duals, consider trade. Jones, 299-2889 after 6.
- '41 FORD coupe in running order, best offer. Lathrop, 298-8638.
- '67 VOLVO, 1225, 4-dr., AC, one owner. Doherty, 255-6398 after 5.
- '55 CHEV. pickup, rebuilt engine, new seat covers, \$450. Padilla, 299-0460.
- '66 PLYMOUTH Valiant 100, std. trans., AC, R&H, \$900. Johnson, 842-9541.
- '64 MERCEDES 220, one owner. Harshman, 898-3337.
- '60 VALIANT, V-200, 4-dr., R&H, \$275. Moe, 255-6271.
- '60 DODGE Polara sport wagon, 9-passenger, V8 engine, AT, R&H, extra tires, \$395. Andrews, 256-7328 after 5.
- '56 INTERNATIONAL Travelall, 4-wd, Dualmatic front hubs, 4-spd. trans. plus transfer case, dual gas tanks, heater, \$550. Elliott, 299-2782.
- '65 GMC 1/2-ton pickup, lwb, straight six, 4-spd., new 6-ply tires, R&H, \$1150. McKnight, 298-4806.
- '66 MALIBU, 327, 4-spd., floor shift, factory air, heater, etc., \$1650. Lumpkin, 299-9179.
- '65 MUSTANG, 289, V8, 4-spd., red, disc brakes, \$1200 or best offer. Gonzales 877-5693.
- '57 BUICK Special, \$225 or best offer, lots of new parts. Bereldi, 344-5802.
- '60 VW dbl.-cab pickup, 1965 engine, covered rear, \$650 or best offer. Wagoner, 299-6801.
- '66 JEEP, 2-4 w/dr., enclosed w/hitch & Ramsey winch, 13,000 miles. Burns, 255-3737.

- '63 FORD convertible, black Galaxie 500, white top, T-Bird engine, AT, radios, \$650. Hawkins, 282-3241.
- '56 FORD station wagon, V8, AT, R&H, make offer. Tomlinso, 344-6882.

### FOR RENT

- OR LEASE: 3-bdr., 1 1/4 baths, carpeted, built-ins, single car garage, walled back yard, playground section, available July 1. Winter, 344-8160.
- SEMINOLE NE, furnished, 1 yr. lease, 3-bdr., fam. rm. w/fp, 2 pianos, covered patio, walled backyard, available June 7. Parsent, 299-1621.
- FOR LEASE: 4-bdr., house, North highway 10, available in June. McFarland, 282-3710.
- RENT OR BUY: cabin, hobby shop, artist studio, storage bldgs., utilities available or will move to your lot. Villella, 298-7955 evenings.
- 2-BDR. HOME in SE, June 1. Cutshall, 255-4013.
- 14' TRAVEL TRAILER, sleeps 6, \$35 per week. Bentz, 299-3448.
- SE, large 3-bdr., 1 1/4 baths, carpeted, landscaped, near bases & schools, no pets. Smith, 298-7365.

### WANTED

- TENT TRAILER to rent over Memorial Day weekend. Prairie, 255-5248.
- WANT TO RENT for summer months, June 15 to Aug. 15, furnished 3-4 bdr. house, \$180-\$240 r/mo. Love, 299-0956.
- SENIOR HIGH SCHOOL student offers full or part-time child care services, your house or mine. Flinchum, 344-1072.
- LLAMA MODEL XV.22 auto. pistol, any condition. Svensson, 344-7700.
- USED OBOE in good condition, must be reasonable in price. Fisher, 265-0626.
- SEWING MACHINE, portable; piano bench. Walsstrom, 299-0163.
- TO BORROW a canoe for BSA Troop 391. Navajo Lake camping trip, Aug. 9-17. I will be responsible for proper handling and safe return. Bray, 298-2334.
- RISE needed to and from vicinity of Zuni & San Pedro to Gate I or Gate II. Langston, 268-6933.
- USED, women's golf clubs, short set. Barton, 255-5491.
- ALTO SAXOPHONE. Traeger, 298-0728.
- USED GERRY kiddie carrier for hiking. Barnes, 898-2375.
- CAR POOL MEMBERS (2) from vicinity of Comanche or Candelaria & Eubank NE to Tech Area 1. Schroll, 299-9142.

### LOST AND FOUND

- LOST—Gold scarf w/brown dots, Rx horn-rimmed glasses, white patent bow from shoe, VW key, grey plastic man's raincoat, wide black framed Rx sunglasses. LOST AND FOUND, tel. 264-2757, Bldg. 610.
- FOUND—Blue colored car key, 10-yr. tie clasp on chain, GM ignition key. LOST AND FOUND, tel. 264-2757, Bldg. 610.

## Western Dance Manana at Club



THE TRIBE, including Chief Billie Rogers (4511) and Vickie Vivian (3256) along with all the modern Indians and cowboys, will be doing the sagebrush shuffle tomorrow night at the Club. Mel Savage will play for dancing starting at 8 p.m.

Cowboys, Indians and all the troops will be out in style for the gala Western dance tomorrow night at the Club. Mel Savage and the Prairie Drifters will be on the bandstand playing the sagebrush shuffle while the kitchen staff dishes out kingsize sandwiches. Admission to the affair is one buck (\$1.50 for guests) and the fun starts at 8 p.m. No reservations required for this one.

### Swim Season Starts

Make a big splash Memorial Day, May 30, and join the opening day festivities at the Coronado Club twin pools. The event is free to members and the party will include Mike Michnovicz and accordion playing the old sing-a-long songs and the new songs that nobody can sing. "Roll Out the Barrel" could be the theme song; special prices for refreshments from 1 to 4:30 p.m. The snack bar will be open but other Club facilities will be closed for the holiday. The pools will open at 11 a.m.

### Social Hours

Tonight the Rhythm Masters will be making the happy music while the TGIF crowd is treated to the Mexican food buffet. Social hours get underway right after work on Fridays with special prices through 8 p.m. The band plays from 6 to 9 p.m. and the buffet is spread from 6 to 8 p.m.

With the Memorial Day holiday on May 30, social hour will be held on Thursday, May 29, from 5 to 8 p.m. in the main lounge. No buffet will be prepared.

On Tuesdays, the mid-week social hour runs from 5 to 8 p.m. in the main lounge.

On Friday, June 6, the seafood buffet will be the menu feature while Tommy Kelly plays for dancing.

### June Highlights

A couple of events scheduled in June are worth noting on your calendar now. The annual luau with the fabulous Polynesian menu and dining on the Club patio is scheduled Saturday, June 7. A special import of San Miguel brew will be stocked for Field Testers while the rest of us can appreciate a Mai Tai in fresh pineapple.

On Thursday, June 19, a swinging group called the Mexicali Brass, which features a tremendous trumpet player named Teddy Phillips and a mini-skirted vocalist called Colleen Lovett, will present a show-time dance-time evening. This will be very special entertainment and the admission will be only \$1 for members.

## 'Lost Art' of Caning Is Revived by Sandian Bill Ingram

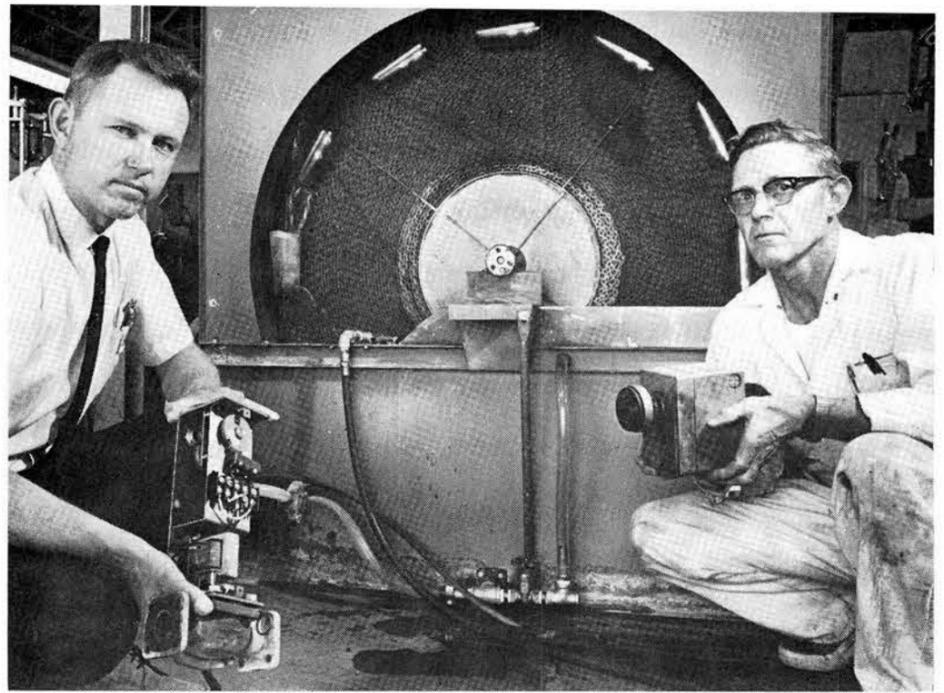
When Bill Ingram's wife wanted an antique rocking chair with cane seat and back, Bill discovered that the good ones were very expensive, and that there was no one who could recane those not in usable condition. So Bill, who works in Active Ceramics Materials Division 2317, revived what was nearly a lost art and in the past six years has recaned some 35 or 40 antique chairs.

"I tried to find someone who could do recaning," says Bill, "but when I couldn't find anyone I bought a book and learned to do it myself." Caning is slow, delicate work. Bill says it takes about 40 hours to recane a rocker such as shown here. His most intricate job to date, recaning a six-foot couch which originally came from Barbados, took four months.

The cane Bill uses comes from Malaya. The only other place the proper kind of cane is grown is in Germany but Bill feels it is inferior to the Manalyan variety. Bill uses a six-strand weave. He first soaks the 12-foot cane strips, then carefully weaves them into the chair and allows them to dry. "I work slow and easy," says Bill. "If you try to rush it you're likely to break a strand and then have to repeat the job."

Bill says that as far as he knows only one other person in the Albuquerque area practices the ancient art of caning. "Consequently, I get a lot of requests—more than I care to handle—from local antique dealers and people who have old chairs they want restored."

Mr. and Mrs. Ingram live at 628 Los Arboles NW.



WATER WHEEL adapted to a rotary evaporative air conditioning system replaces an expensive timer and dump valve, displayed by Earl Gruer (4542), left, and a gear motor held by Barney Dumond (4511), right. The new system was devised by Earl in an effort to provide a more reliable system and to reduce maintenance costs. Preliminary tests are extremely promising.

## Ancient Water Wheel Idea Solved Sandia Air Conditioning Problem

In a time and at a place where advancing technology tends to produce increasingly complex mechanisms, it is refreshing to hear a success story where an extremely simple and ancient device solved a modern problem.

The water wheel, in use since the dawn of civilization, has solved a nagging air conditioning problem at Sandia Laboratories.

A simple adaptation of the water wheel may make it possible for Plant Engineering Department 4540 to eliminate an expensive timer, dump valve, and gear motor from the rotary evaporative coolers used in many Sandia buildings. The previously used equipment costing \$155 can be replaced by a device consisting of a number of plastic ice tea glasses and a \$30 pump. Maintenance of the older equipment was the expensive part of the air conditioning systems, according to Hal Baxter of Building and Facilities Design Division I 4542.

"These big rotary coolers are ideal for temporary buildings and for facilities where a large volume of air needs to be circulated," he says. "They are very efficient. A problem develops when one of three things happen — when the timer fails to dump the water storage tank and sediment accumulates. This clogs the big wire mesh wheel, and the occupants of

the building start complaining.

"Or the dump valve itself might fail. Same thing would happen. Or the gear motor might fail and the big wheel won't turn. Either way, repair is necessary and this involves several hours. We try to keep spare parts on hand, but we have 250 of these coolers and sometimes we just don't have enough spares."

Hal discussed the problem with Earl Gruer (4542) and, more-or-less facetiously, suggested a water wheel. The more Earl thought about the water wheel, the more he became convinced that it was the solution.

After bolting a series of plastic glasses around the outside edge of the filter wheel, he rigged an electric pump to provide a constant stream of water. The stream falls into the glasses, the wheel turns, the thing works.

Barney Dumond (4511), plant technician, assisted with the project.

So the plan is to rig five coolers with the water wheel this summer and evaluate their performance under use. As the present equipment breaks down, the water wheel can be installed.

Earl estimates that if this system had been used last year, some \$2200 would have been saved — not exactly a drop in the old water bucket.



THE OLD AND THE RENEWED—Caning is an art practised by few these days but Bill Ingram (2317) is one of the few. When Bill bought the chair on the right it looked like the other one. Since recaning it, he has been offered several times the \$7 he paid for the chair. He taught himself the art.

## Sandia Safety Signals

A seat belt  
can wrinkle  
your dress.

A windshield  
can wrinkle your face.

