

Payroll Up, Purchases Down

Sandia Laboratories payroll for calendar year 1970 amounted to approximately \$99.8 million, including \$13.3 million at Livermore. The total figure represented an increase of \$3 million over 1969.

Purchases by Sandia from New Mexican firms amounted to about \$27.3 million for the same period, a drop from last year's \$32.7 million. Some 98.6 percent of this business goes to Albuquerque firms. The figure does not include purchases from other AEC contractors.

All of the plant assets are the property of the Atomic Energy Commission. The undepreciated values of these buildings and facilities in Albuquerque, Livermore, and Tonopah Test Range (Nev.) totaled about \$286.6 million at the end of 1970 compared to \$259.6 million in 1969.

Variable Annuity Unit Value

Jan. 1971	1.469
Dec. 1970	1.418
Average 1970	1.417

We Have A New Printer

Half-way through the press run of this issue (due out last Friday, Jan. 8), our printer had some financial difficulties and was forced to close down his plant. Our new printer, Newspaper Printing Corporation, has been most accommodating in meeting our request to get this edition published quickly. Readers will note that the paper has a somewhat different format as well.

Now that our printing difficulties appear to have been settled, we shall resume our regular two-week publishing schedule. Next LAB NEWS will be issued Jan. 29, and deadline for receipt of ads for that issue is noon on Friday, Jan. 22.

Phil Nicovich Leader at US-British-Canadian Meet

Phil Nicovich, supervisor of Project Design Definition Division 7612, returned last month from the 1970 American-British-Canadian (ABC) Conference on Unification of Engineering Drawing Practices, which was held in London.

The ABC was organized after World War II with the objective of unifying engineering standards of the three countries so that engineering data can be interpreted and utilized with a minimum of delay or inconvenience. Phil is leader of the U.S. delegation.

The agenda included 25 items, many of which were agreements to recognize standards on dimensioning and tolerancing that have recently been revised in the three countries.

Phil's paper, "U.S. Report on ABC Unification Progress," was distributed in advance of the meeting for discussion and review. Eight other U.S. papers were presented, including several suggesting exploratory subjects.

"Only one major difference was not resolved during the meeting and an ad hoc committee was set up to go into further discussion of 'limits of size interpretation,'" Phil reports.

Annual Meeting of Sandia Credit Union Scheduled Jan. 21

Business session of the Sandia Laboratories Federal Credit Union annual meeting will start promptly at 5:30 p.m. on Thursday, Jan. 21, according to Bill Prekker (4122), president. The meeting will be held in the ballroom of the Coronado Club.

Following the business session, refreshments will be served.

As door prizes, two portable color television sets will be given away. Each member attending will receive a small gift.

LAB NEWS

VOL. 23, NO. 1

JAN. 15, 1971

SANDIA LABORATORIES - ALBUQUERQUE NEW MEXICO & LIVERMORE CALIFORNIA



STATE OF THE LABS is President Hornbeck's subject in interview with LAB NEWS Editor John Shunny (left).

John Hornbeck Discusses Sandia

Continuing a practice he began three years ago, President Hornbeck discussed the state of Sandia with LAB NEWS editor John Shunny and Director of Information Max Linn (3400).

What is your view of Sandia's present and future — how are we doing?

Last year Sandia went through some trying times, but to sum up our present and future, I'd say that I am cautiously optimistic. Let me cite a few reasons.

First, we are now half way through fiscal '71 and the budget for the balance of the fiscal year looks good. This will give us a good entry into fiscal '72.

Fiscal '72 (July '71 to June '72) is now our concern. Of course, we don't have firm dollar figures yet, only estimates of funds that will be allocated to us, but these estimates show that our tight overall situation will not be much changed. Because we have to assume continuing inflation, a given amount of money will buy less next year. For this reason, most of the people we lose through attrition in this period will not be replaced. When June 1972 arrives, Sandia will thus have an estimated 300 fewer people than we now have.

Here are a few other observations about the Labs and its operation that are very positive factors. Our fiscal management — the way we handle the money — has become highly knowledgeable, thanks largely to our people effectively using the case

management system introduced three years ago. And one additional benefit of this increased awareness of the financial side of the operation is better management of technical programs — we've become much more skillful in our technical and financial direction of programs.

After all is said and done, I think the results of the voluntary layoff last April have proved to be healthy for Sandia and, in many instances, for the people involved. A layoff is a distressing thing, but our arrangement (i.e., voluntary layoff) was helpful in that it made the separation less painful.

Our weapon program workload remains about the same, although DOD is feeling the budget crunch too and they are proceeding more cautiously in all their programs.

One other thing. I feel strongly that our business always needs new people, so we will continue a program of staff recruitment, even if on a very modest scale.

Sandia recently elected to discontinue work on the SNAP programs — why?

AEC Division of Space Nuclear Systems had a view of Sandia's role in the program that was different from ours. We believed our role was one of technical support with authority to make technical decisions. But AEC SNS wished to retain detailed decision-making authority. In the final analysis, this difference of opinion led to our decision to ask AEC to handle the whole thing.

How about "reimbursables" — any trend toward a greater percentage of our effort going into non-weapons work?

No, I don't see any such trend. The picture in that area is still reasonably bright, however, and because we have something to offer we continue to get work of that type. For example, I had a call yesterday from Washington asking Sandia to continue important R&D work related to the COIN project (the Sandia program for development of electronic intrusion detection devices).

The percentage of our workload in this reimbursable category will in all likelihood remain about the same — 10 to 12 percent, dollar-wise.

How are personnel programs such as Affirmative Action affected by reduced spending?

Because hiring of new people of all types will be down, it's clear that hiring of persons from minority groups will likewise be



reduced. On the other hand, our present training programs for people already on the roll will be maintained, and these do make a solid contribution to the Affirmative Action program. The newly formed pre-secretarial training program as well as the apprentice programs, both of which the unions have supported wholeheartedly, are examples of what we are trying to do. These are good programs for Sandia.

Do you see any changes in our retirement plan?

To me, a beneficial change in our retirement program would be to make it possible to retire before age 60 without so severe a penalty. Among other things, this would make early retirement more attractive. I have some hope for progress in this direction.

What about Sandia Livermore?

The scope of the work there will remain about the same, but I am gratified to see significant staff improvement. There have been facility improvements there as well in the last year, for example the Computer Center. Applied research at Livermore has also hit its stride and is making important contributions.

Mr. Hornbeck, this month is your 25th anniversary with the Bell System. How do you react to the occasion?

That's easy. I said to myself, "Gosh, isn't there some way to avoid this thing?"





TONOPA H TEST RANGE was visited by Sandia management recently. Standing in front of the F-27 aircraft used to shuttle TTR workers to the Range from Las Vegas are, from left, Charles Campbell (4000), President Hornbeck, Tom Cook (8000), Sam Moore, manager of TTR (7370), Richard Bice (7000), Charles Bild (7300), Richard Partridge (6000) and Ray Powell (3000).

Energy Needs, Nuclear Power, The Environment—Big 3 For the 70's

Working at Sandia, living in New Mexico, most Sandians are in closer touch than other citizens with the problem of supplying ever-increasing amounts of energy in electrical form without undue contamination of our still reasonably clean environment. The AEC is a strong proponent of nuclear power and, in spite of admitted environmental drawbacks, the agency makes a good case for its increasing use.

Here are excerpts from a recent talk about the role of nuclear power by Commissioner Clarence Larson.

Fossil Fuel Supplies

"The timely construction of nuclear power plants and the development of improved systems is important for many reasons. It is obvious that our hydroelectric sources of power are limited. Our gas supplies are being used at a higher rate than the reserves are being developed. Even though we have large reserves of coal, it is becoming increasingly difficult for the utilities to obtain long-term commitments for coal supplies, and then, of course, there are the problems of air pollution, etc. Residual fuel oil, of course, is an attractive fuel for electric power, but in most cases again the utilities are having difficulty in obtaining long-term contracts, and supplies are limited.

Present Nuclear Capacity

"At the present time there are almost 87,000 MWe of nuclear power plant capacity in operation, under construction or on order. Seventeen plants have become operational, with a combined capacity of around 6000 MWe. Three large nuclear units became operational in 1969, and three large units have become operational thus far in 1970, with the possibility of two additional units coming into operation by the end of the year. Next year, 10 additional units are scheduled for operation. If these units operate as scheduled the total nuclear capacity in operation at the end of 1971 will be about 15,000 MWe.

Nuclear Costs

"Even though there have been delays as long as two years in the construction of nuclear power plants, resulting in increasing cost, nuclear power seems to be maintaining a strong competitive position. The fact that the number of nuclear power plant orders during 1970 are more than twice the orders during 1969 is evidence that nuclear power will play an increasingly important role in meeting the electric power requirements in the United States.

Environmental Problems

"I must acknowledge that we do have a relatively more difficult problem in some localities in the amount of cooling water that is needed to cool the condensers in a

nuclear plant in comparison to the amount of cooling water needed to cool the condensers in a fossil-fired plant. The nuclear plant has to reject to the environment about 67 percent of the heat that it produces as compared to about 61 percent in present-day fossil plants because of the difference in the thermal efficiency of the two systems. The fossil plant rejects about 20 percent of the total heat generated to the atmosphere and about 40 percent to cooling water.

"This does not mean that a nuclear plant discharges hot water. Contrary to most public opinion the discharge temperature of water from a nuclear plant is only 15° - 20° greater than the entering water. Much of the year in many parts of the United States, discharge temperature is even too cold to swim in comfortably. Careful studies in the United States and Europe have not disclosed any demonstrated harmful effect from nuclear plants on fish or other Marine life, but we are continuing studies to insure that none will occur in the future.

What About Fusion?

"Nuclear fusion was discovered in 1934 but did not receive any significant attention as a means of energy release until after the war when the hydrogen bomb was developed. I can remember vividly, in 1944, discussing the fusion reaction with Professor Oliphant, the discoverer of the reaction. As you can see, while the basic discovery is very old, a program to develop controlled thermonuclear processes as a new source of electrical energy did not begin until 1952. In light of the rapid successes in fission, researchers were extremely optimistic about an early success in controlled fusion. While initial progress was rapid, it was soon found that plasma physics — the basic science involved — was far more complex than anticipated. As a result, controlled fusion research became a more basic research program.

"Now, after about 18 years of research effort, plasmas confined to the maximum theoretical upper limit have been produced in a variety of experimental configurations.

"The tasks ahead are formidable, however, and large commitments of resources must be made. All of the elements necessary to actually demonstrate the feasibility of this process must be assembled into one or more large experiments. Although the thermonuclear process does offer the potential of a source of unlimited power using deuterium recovered from the sea, contrary to the general opinion it does not eliminate all the problems associated with fission reactors. For example, there will be tritium and induced radioactivity problems remaining.

Take Note

Dean Irvin, supervisor of Employee Benefits Division 3122, and Mike Barela (4338) were recently commended by the Chairman of the State Personnel Board for their participation on a task force on employee benefits.

The Governor's Advisory Council for Personnel Administration created the task force to study the "fringe benefits" available to state employees to compare the benefits with current trends in the Federal government and in private industry, and to make recommendations.

Dean was vice chairman of the seven-member group which submitted its report before the end of 1970.

The Sandia Graduate Wives Club will hold its regular meeting Monday, Jan. 11, at 7:30 p.m. at Albuquerque Federal Savings and Loan, Menaul Branch. Mrs. Robert Graham and her daughter will show slides and speak on "Amigos de las Americas."



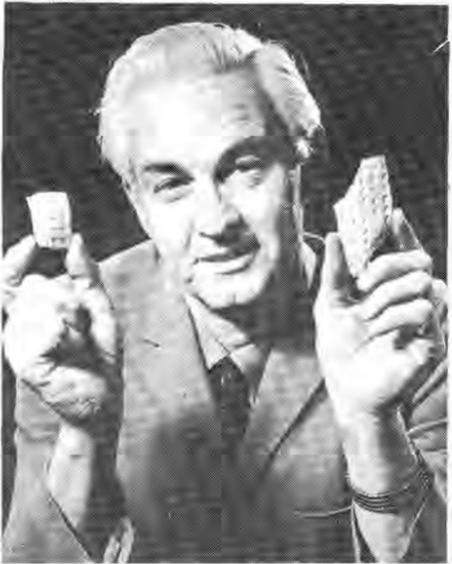
Douglas Loescher (5153) presented "Ellipsometry" at a meeting of the 5100 Staff Seminar Jan. 5.

On Jan. 12 Eric Jones will present "Sandia Pulsed Laser Facility: A Progress Report and Laser Produced Impulses in Solids."

The seminar meets on Tuesday mornings at 8:30 in rm. 201 of Bldg. 806.



CHRISTMAS PRESENT from your mother-in-law? Nope. Joe Tilley (4511) dug up this what-cha-call-it in his backyard at Snow Heights #2 some 15 years ago. He's still trying to find out what it is.



POTSHERDS AT GATE 10! Dick Illing (9512) must walk with his eyes glued to the ground because in recent months he has found four pieces of unglazed, light tan pottery in the vicinity of Gate 10.



SUPERTUTORS these days include active employees as well as retirees who like to contribute their time to helping a youngster. (Left) L. D. Watkins (7292) meets once a week with Barbara, a high school sophomore, to tutor her in geometry. (Right) Retiree Anne Barrett is frequently greeted with the request, "Take



me today," when she arrives at Longfellow elementary school on Tuesdays. Here she helps first graders Michael and Leroy with their reading assignment. You, too, can help in this program. Call the Albuquerque School Volunteer Program, tel. 242-1056.

LAB NEWS

Published every other Friday

SANDIA LABORATORIES

An Equal Opportunity Employer
ALBUQUERQUE, NEW MEXICO
LIVERMORE, CALIFORNIA

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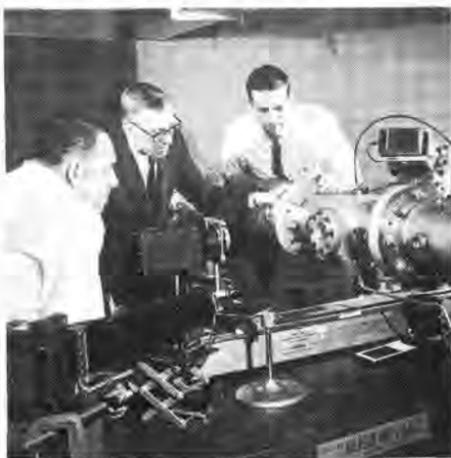


1970 Highlights at Livermore

As 1970 comes to an end, the LAB NEWS reviews some of the significant happenings which occurred at Sandia Laboratories Livermore during the year.

January

Water drop experiments were conducted in a cold-gas shock tube facility at Sandia/Livermore. Analysis of water drop breakup in a high-speed, high-density air flow relates to the problem of rain erosion of surfaces of aircraft and missiles.



Rain erosion studies

Livermore employees received two Awards of Merit for outstanding safety achievement — one from the AEC recognizing more than 1,350,000 injury-free man-hours worked during the period July 22, 1968, to March 31, 1969; the other from the National Safety Council recognizing over two million man-hours worked without injury from July 25, 1968, to July 28, 1969.

March

A Livermore employee was named to a number of posts associated with the development of apprentice and other State of California vocational training, including chairman of the California Machinist Statewide Joint Apprenticeship (JAC) Committee which reviews applications of firms seeking State approval to establish apprenticeship programs.



Apprenticeship programs

Sandia/Livermore hosted the 18th meeting of the Inter-agency Mechanical Operations Group's (IMOG) Environmental Testing subgroup. IMOG coordinates information exchange within the AEC complex to improve the fabrication and physical inspection of weapon components and assemblies.

Employees at Livermore continue to receive letters of appreciation from the various health and welfare agencies they are supporting for the first time under the Livermore Employee's Assistance Plan (LEAP) established last year.

April

As a result of the decreased AEC funding for Sandia Labs for FY '71, a reduction in the number of employees on roll was necessary. During the layoff, a total of 62 employees left Sandia/Livermore, including 40 who offered to take voluntary lay-off.

An employee in Livermore's Plant Engineering Division designed adjustable aluminum steps to solve the problem of keeping a staircase and platform level with a mobile office that has settled. The new design



Appreciation for LEAP contributions

eliminates time-consuming modifications required on wooden staircases.

May

Livermore's apprenticeship programs for mechanical measurement technicians and mechanical, electrical, and structural plant technicians was officially certified by the State of California.

Nine employees were selected for the first class. The programs consist of on-the-job training and out-of-hours classroom instruction at Chabot College.

An employee in Livermore's Metallurgy Division was presented the Institute of Printed Circuits "President's Award" for his contributions to the advancement of printed circuit technology and the electronics industry.

Sandia/Livermore received a certificate of appreciation from the Livermore Centennial Committee for its support of the observance of the Centennial Anniversary of the City of Livermore last year, includ-



Family Day at computer facility

ing Sandia's participation in the industrial display. The Chairman of the Centennial Committee, a Sandian, presented the certificate.

June

Sandians at Livermore contributed 85 pints of blood during the annual Blood Bank drive. Administered by the nonprofit Alameda-Contra Costa County Medical Association, the Sandia Blood Bank account makes blood available at reduced cost to all employees and their families.

July

A building contract was awarded for the construction of an addition to the south end of Administration Bldg. 911 and a new assembly building in Area 8. The addition to Bldg. 911 will be the new main entrance to the Laboratory.

As part of the continuing security program at Sandia/Livermore, a series of



Impulse loading of structures

LIVERMORE NEWS

VOL. 23, NO. 1

SANDIA LABORATORIES

JAN. 15, 1971

Touring Northern California

A grand exhibit of Vincent van Gogh's art is now on display through Jan. 31 at the M. H. deYoung Memorial Museum in San Francisco's Golden Gate Park.

San Francisco is the next-to-the-last stop in the current United States tour; then, after a van Gogh retrospective in Paris, the collection will be housed permanently in the new State Museum in Amsterdam, scheduled for completion in 1972.

Owned by the Vincent van Gogh Foundation which is headed by the artist's nephew and namesake, the collection being shown consists of 68 oil paintings and 46 drawings and watercolors. From calendars and posters, the back of playing cards, and the biographical novel and film, "Lust for Life," nearly everyone is familiar with van Gogh's painting. But only by seeing the original oils, their rich colors thickly daubed by brush or palette knife, can one fully realize the texture and extra dimension of his work.

The exhibition is open daily from 10 a.m. to 5 p.m. (no one is admitted after 4 p.m.). Admission is \$1 for adults, 50 cents for students. The show is attracting record crowds, so a wait may be expected. Museum officials suggest the best chances for entering without delay are shortly after 10 a.m.

Marlin Pound Heads Recreation, Parks District



Marlin Pound (8236) was recently elected 1971 chairman of the board of the Livermore Area Recreation and Parks District (LARPD). Appointed to the five-member board in 1967, he is now completing a four-year elected term begun in January 1969.

LARPD is a tax-supported special district created by the California Legislature to provide recreation and park facilities for people located within a 245-square-mile area of the Livermore-Amador Valley. Its \$730,000 FY '71 budget includes recreational programs for all age groups as well as planning, developing and maintaining park properties acquired by the district and the City of Livermore.

Marlin joined Sandia in July 1957 and supervises the Training and Benefits Division at Sandia Laboratories Livermore. He is a member of the American Society for Training and Development and the American Society for Engineering Education. He received a BS degree in business administration from the University of New Mexico.

In addition to the LARPD activity, Marlin also serves as a board member of Livermore's Student Education Loan Fund (SELF).

security monitor reminders was developed for use throughout the Laboratories.

Two employees returned to Sandia/Livermore after earning Master of Science degrees under the One-Year-on-Campus (OYOC) Plan of Sandia's Graduate Education Program. Through the Plan they received MS degrees in mechanical engineering while in residence at Stanford University for one academic year.

For the sixth summer, Sandia/Livermore participated in the national Youth Opportunity Campaign to provide temporary summer work and training experience for students returning to school in the fall. This year 17 YOC Trainees were on roll at Livermore.

August

Sandia/Livermore received recognition for its contribution to the National Alliance for Businessmen, a program devoted to meeting the problems of the hard core unemployed.

A chemist in Livermore's Materials Division contributed to a new college textbook on the chemistry of the polyurethanes.

September

The annual Livermore Employee's Assistance Plan (LEAP) contribution campaign netted over \$33,000, a 9.7 percent increase over the amount given during the previous year's drive. Under the Plan employees have the opportunity of contributing to eight local and national health and welfare agencies in addition to the 180 United Bay Area Crusade (UBAC) agencies.

October

Sandia/Livermore opened its new underground computer facility to families of employees whose work is computer related. The primary calculational systems include a CDC 6600, a CDC 3600, and a number of supporting systems.

Livermore co-hosted the semi-annual AEC Affirmative Action Conference. The Conference brought together over 100 personnel managers and training representatives from facilities throughout the AEC complex and various representatives of economic opportunity programs in the Bay Area.

Livermore now has seven numerically controlled machines in the Laboratory's

model shop. The latest acquired is a three-axis, 15-tool turret machining center. Each piece of numerically controlled equipment requires a computer language of its own because of unique capabilities.

November

A full-time Sandia Credit Union representative was established in Livermore to provide services for Livermore members.

Development of magnetic flyer plate techniques and photographic measurement instrumentation at Sandia/Livermore made it possible to subject a structure to impulses of 1000 to 100,000 taps. Peak pressure accompanying these impulses ranged from 1-300 kilobars and lasted 50-500 nanoseconds. Images of event were photographed in one-half microsecond.

December

An industrial hygienist in Livermore's Safety Engineering and Environmental Health Division was named to a seminar series on Comprehensive Health Planning in Action to be held in California, Utah, and Arizona. The series was made possible through a grant from the U. S. Public Health Service.



Numerically controlled facility

1970 Sandia Highlights--A Year in Review

A custom for LAB NEWS at year's end is to present a compilation of significant happenings at the Laboratories. This was 1970 at Sandia:

January

The SNAP-27 nuclear generator placed on the moon in December by the Apollo 12 astronauts continued to operate after encountering the extreme temperatures of a complete lunar cycle.

February

President Hornbeck announced that reduced funding for AEC and DOD programs as proposed in President Nixon's fiscal year '71 budget message would affect operations at Sandia Laboratories. A reduction in staff of approximately five percent within the next few months by retirements, resignations and possible layoff was anticipated. (A short period later, a "voluntary layoff" plan was announced for employees interested in leaving the Laboratory.)

Up in the frozen north—Chukchi Sea off the northwest coast of Alaska—the U.S. Coast Guard was conducting tests to determine the value of small instrumented projectiles dropped from aircraft to measure the thickness and hardness of sea ice. The terradynamics projectiles were developed by Sandia in 1960, but this was the first time they had been used to determine the characteristics of sea ice in polar regions. Such measurements are now made primarily with hand-operated core drills and are limited to those areas accessible by ship or helicopter.

March

Vice President Solomon Buchsbaum was named a member of the President's Science Advisory Committee. The Committee provides President Nixon with evaluations and advice on scientific and technological matters at policy-making levels.

An EMR 6130 computer was being installed to make possible "real time" data acquisition and analysis of laboratory experiments and tests. The system is similar to one in operation since last Spring in Area V.

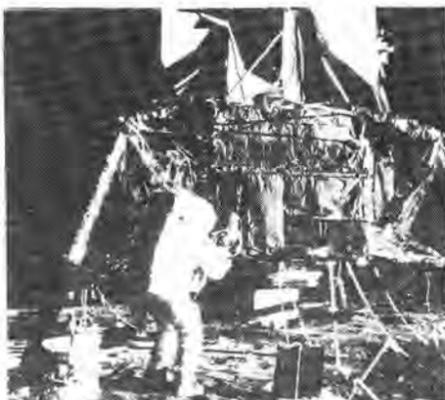
April

President Hornbeck announced that 450 employees elected to take voluntary layoff by the March 31 deadline. The total reduction in force by (both voluntary and involuntary) layoff and early retirement was expected to be about 590. The reduction in number of employees was deemed necessary to meet budget restrictions in FY '71.

A half dozen Sandians were responsible for specific activities in Project Tugboat, an experimental attempt to create with conventional high explosives a new harbor for small boats off the island of Hawaii. The experiment also had application in providing data which could be applied to the use of other chemical or nuclear explosives for large-scale civil engineering projects.

Apollo 13, the third manned mission to the moon, carried on board another SNAP-27 radioisotopic generator designed to power an array of scientific experiments. The unit was the same as that deployed on the moon by astronauts of Apollo 12, which operated successfully in temperatures ranging from -291°F to 283°F.

Sandia also provided advanced logics systems and some of the sensors for Vela V-B, a pair of nuclear detonation detection satellites that were launched from Cape Kennedy. Sandia was responsible for the design and fabrication of the logics systems and special pre-launch test equipment.



SNAP-27 fuel capsule on the moon



Carbon/Carbon technology

May

Increased emphasis on processes for producing carbon filament reinforced carbon has resulted in hardware with unique properties. In use as a rocket nose cone, the heat shield of carbon/carbon becomes stronger with higher temperatures, such as those encountered during reentry.

A series of rocket launches was started from Barking Sands Launch Facility on Kauai, in the Hawaiian Islands. Sandia, Los Alamos Scientific Laboratory and Lawrence Radiation Laboratory all had interests in the high altitude experiments.

An AEC patent application was filed for the first transparent ferroelectric ceramic ever produced. The ceramic—made of lanthanum lead, zirconium, and titanium—can be used to generate black and white as well as color images and is suitable for use in memory and display devices similar to those used for computer information storage.

June

A high velocity, low altitude test vehicle for materials research and studies of aerothermodynamic heating achieved Mach 8.6 at an altitude of 10,000 feet during its maiden flight over the Tonopah Test Range. The rocket had the greatest acceleration of any system tested at Tonopah. Except for the motors, the entire vehicle was fabricated in Development Shops 4200.



Deep sea simulator for explosives

July

A unique approach to testing small explosive sounding devices was achieved with design of a deep sea simulation chamber which can duplicate pressures at 15,000 feet below the surface.

A PDP-10 timesharing computer system was placed in operation in Bldg. 880. The computer has 36 remote terminals in build-

ings throughout Tech Area I. Initially some 200 members of the staff were given access codes to use the new system.

A total of \$530,000 in cost improvement was credited to two employees for their efforts in declassifying the production of a ceramic element. Over a period of two years the savings will be derived from simplified physical handling of the component and a broader competitive basis in various procurement actions.

August

New techniques were developed for use of cannon-launched projectiles in shock and acceleration testing. The specially-designed 155mm cannon shells at Tonopah Test Range are used to subject test components to accelerations of up to about 16,500 times the force of gravity. Major improvements include better control of the environmental conditions encountered and innovations for in-barrel telemetry.

Sandia Laboratories Exhibit Center (formerly called the Sphere of Science) was kept open during the noon hour for visits by employees and their families.

A change was announced in the Educational Aids Program. For approved courses which do not require the employee to take time off the job for attendance, Sandia will pay 100 percent of the normal tuition fee; 50 percent tuition aid will continue to be paid for courses requiring time off the job for travel or attendance.



Frogman retrieval at Coyote Canyon

September

More than 400 retirees turned out for a social hour and dinner at the Coronado Club and a chance to renew acquaintances.

A helicopter and a pond in Coyote Canyon with a 90-square-foot target area was the testing site for a small parachute-flotation bag recovery system for rocket payloads. Radio contact between two transit operators (at right angles to each other) made possible the exact positioning of the helicopter for the drop.

It finally happened: a Sandia engineer became the first man in the AEC complex to be aboard an airliner hijacked to Cuba. While en route from Chicago to Philadelphia, a passenger ordered the pilot to detour to Cuba. After three hours in the Havana airline terminal, the passengers were returned to the plane to continue their scheduled flight.

Fifty Sandians returned after participating in a test readiness exercise in the Pacific. Highlight was the successful launch at Johnston Island of a Thor booster with a high altitude test vehicle. Although no nuclear components or explosive warheads of any kind were used, the main purpose of the launch was to assure that the delivery system was capable of transporting a test device for detonation at a predetermined time and point in space.

October

Sandia's "Flying Laboratory" left for the Arctic Circle for continuation of a study of atmospheric phenomena associated with the aurora borealis and aurora australis. The scientists are interested in determining the energy source that creates and maintains the aurora and the energy transfer mechanism involved in their formation. The route for Sandia's plane was from the tip of the Alaskan peninsula toward the North Pole.

Development tests of two new rocket systems were successfully conducted at

Barking Sands Launch Facility on Kauai in the Hawaiian Islands. The Terrier-Re-cruit low altitude, high acceleration system carried a 65-pound payload which separated and was recovered by parachute. The two-stage Sandhawk-Tomahawk, a high altitude sounding rocket, carried a 175-pound instrumented payload to an altitude of 320 miles. This payload was also recovered.

More than 84 percent of Sandia Laboratories' employees signed up for the Long Term Disability plan, which was offered for the first time this fall.

A Patent Training Workshop and a monthly newsletter originated by Patent Department 6010, was apparently paying off in an increased number of patent disclosures.

November

The first development test on Sandia's new rocket sled launching facility was conducted successfully. The launcher consists of five structural steel support sections which can lower or raise a 300-foot section of rails at the end of the 5000-foot sled track. A downward curve would be used to impact test units into concrete or other targets; the upward slope would be suitable for launching test units into free flight for test of parachutes and similar hardware.

Final tabulation in the recent Employees Contribution Plan campaign showed \$322,590 pledged to support the 32 agencies of the United Community Fund and eight other national agencies. Eighty-two percent of the Albuquerque employees contributed for an increase of \$22,885 over last year's drive.

A second aerial cable facility went into operation in Coyote Canyon Test Field. The unique device is capable of handling test units weighing up to 1000 pounds at velocities up to 900 feet per second. These are the only impact testing facilities in the country able to duplicate an air drop of a test unit under controlled conditions and produce precise photometric data.

The latest training program offered in the Development Shops aims at producing a laboratory craftsman with wide experience plus academic training in scientific fabrication processes. Seven on-roll employees are in the first class. Total time in the program will be three years and eight months.

December

Good year-end news for employees carrying the second Supplemental Group Life Insurance policy. Premiums will be waived for the next four months.

Thirty Sandians were honored for their contributions to the SNAP-27 program. The occasion was the first anniversary of operation of the nuclear generator on the lunar surface. The generator has already exceeded its design requirements.

Continuing research has resulted in a way that spacecraft can be sterilized in a short period of time while maintaining temperatures below 212°F. The method utilizes a low level of radiation combined with heat. By international agreement, spacecraft are sterilized to reduce the possibility that micro-organisms from earth will contaminate other planets.



Transparent ceramic material with bright future



JIM POWELL (4223) removes a 250 microgram unit of californium-252 from its storage tank in Bldg. 6588. The tiny source, encased in stainless steel, emits 4×10^8 neutrons per second.

World's Rarest Element

Californium-252 Valuable New Source for Research, Testing

Less than 100 milligrams of californium-252 exist making it one of the world's rarest elements.

It is a man-made radioisotope distinguished from other radioisotopes by a combination of two properties — it emits a large number of neutrons by spontaneous fission (2.34×10^{12} neutrons per second per gram) and the half-life of its radioactive decay is reasonably long (2.65 years). Californium-252 is the only known radioisotope that can be fabricated into small-sized sources that emit neutrons intensely over a practical period of time.

For this reason, a source of californium-252 "is like a hot little portable reactor" according to Doug Ballard, supervisor of Nondestructive Testing Division 7361. The Division recently received a two-milligram source which will be used to make neutron radiographs of explosive components, composite materials, plus various circuitry and hardware.

One other californium-252 source is in use at Sandia Laboratories. Jim Powell of Radiation Source Diagnostics Division 5223 is using a 250-microgram source to calibrate proton-recoil proportional counters and to conduct fast neutron spectroscopy studies on the SPR-11 reactor and on the Hermes II flash x-ray machine in Area V.

Jim is the Sandia representative to the AEC's Transplutonium Committee which allocates the available supply of californium-252 sources to requesting agencies. Jim reports that by next spring, Sandia will be using nine milligrams of californium-252, primarily in research and nondestructive testing at both Sandia and Livermore Laboratories.

A neutron radiograph is very similar to

an x-radiograph. Both show internal structures but the film produced from a neutron exposure reveals information different from that of an x-ray. A neutron radiograph, for instance, reveals the detailed structure of hydrocarbons and plastics while x-rays do not. Both the californium-252 source, Division 7361 used the SER and ACPR reactors in Area V as neutron sources for making radiographs. Although effective, the facilities have some limitations. A californium-252 source is relatively portable, does not require the elaborate controls that reactors do. Exposure times of hours and days can be easily made.

Sandia's californium-252 source for non-destructive testing will be housed in a new testing facility in Area III (Bldg. 8635). It is currently being used in the radiography laboratory in Bldg. 860.

Jim Powell's source is contained in a four-ft. diameter tank of sodium fluoroborate in the experimental area of Bldg. 6588 in Area V. It can be removed, with proper handling, and used for numerous experiments in the area. It has been used, for instance, as a standard for neutron output.

The AEC predicts important applications for californium-252 in the fields of research, medicine, aerospace, agriculture, industry and mineral exploration. The thrust of the AEC's Transplutonium Program is to make transplutonium radioisotopes available to many laboratories for research and development for the national welfare.

Within a few years, several grams of californium-252 will be produced and hundreds of grams could be made available by 1980.

And It Hasn't Changed Much

(From the First Report of the Game and Fish Warden for New Mexico, 1909-1910-1911)

"There is not a man living, who is tossed about, month after month, in the bustle and bang of business life, who does not need a vacation. He needs it for his mental, moral and physical development. He needs the woods, the music of the streams, the rock-ribbed mountains, the warbling birds, and the chance to drive out of the fetid air of the stuffy office and dusty street, and to fill his lungs with the pure, undefiled, vigorous ozone, found only in the mountains, the forest and open field."

Author of the above words was Thomas P. Gable, New Mexico's first game and fish warden, who bridged the years between Territory and Statehood. They are found in a thin volume owned by Felix Padilla (4544) inherited from his father who was a friend of Mr. Gable.

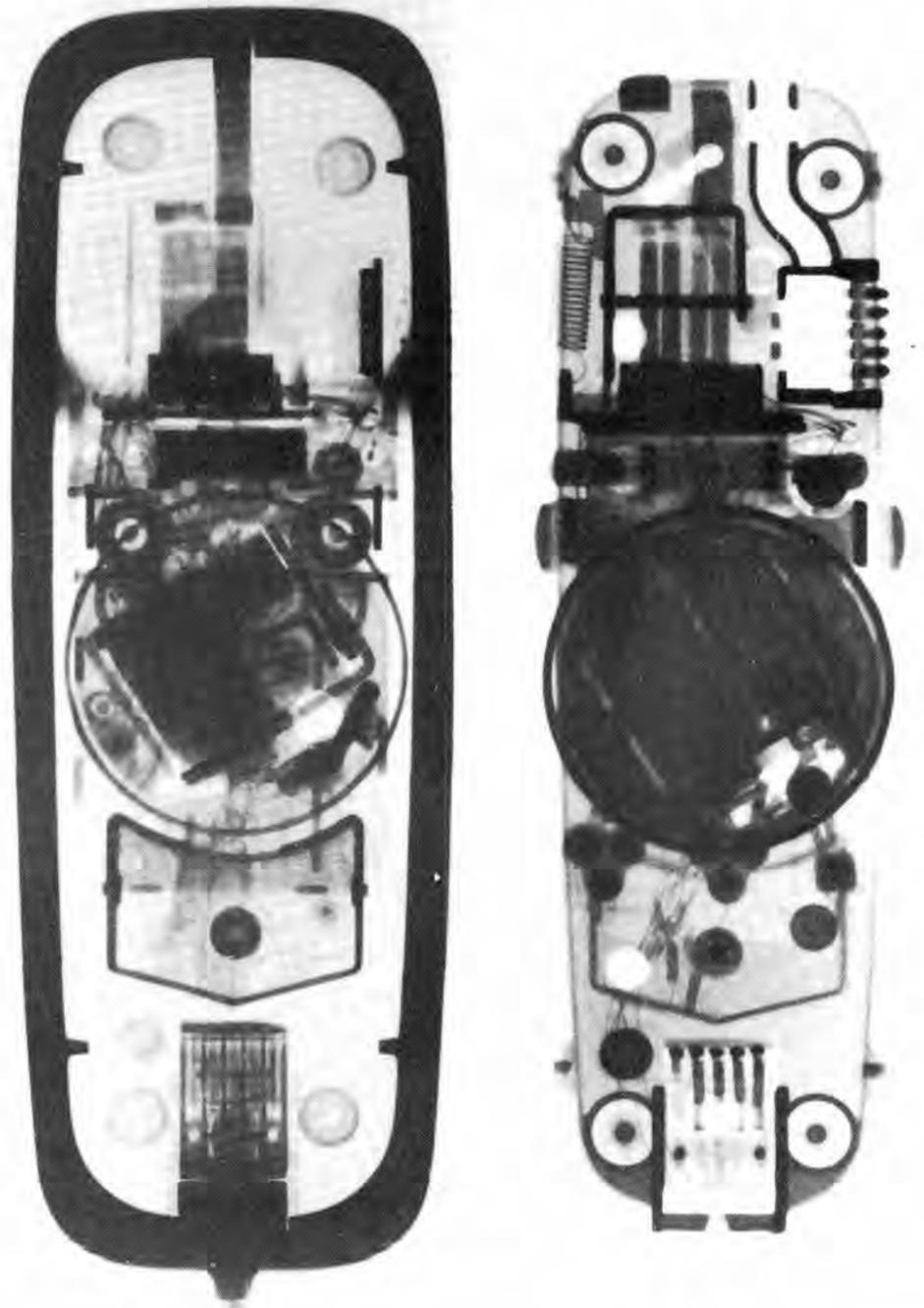
Another excerpt from the Report:

"No one who has not seen it, can fully appreciate the beauty, the grandeur, the marvelous attractiveness of this particular spot in Uncle Sam's big domain. Here nature has fairly outdone herself; here she touched the landscape with her most

brilliant colorings; here she marked the channels for the most perfect, the purest, clearest mountain streams; here she builded her noblest mountains and clothed them with a varied and beautiful verdure; here she spread broad, fertile, productive valleys, freshened by rippling waters, and stocked them with game birds, at once the most beautiful, the most attractive, the most sought by the true sportsman and experienced epicure. It is a veritable paradise for the huntsman and for those who truly love the best life of all — the life out of doors, with its pure air, its woody odors, its breadth, its beauty and its power to bestow health. To our neighbors in other states, New Mexico extends a cordial invitation to come among us and enjoy with us the bounties which Nature has poured out here with such splendid abundance."

And, finally, one wonders how the New Mexican gun-owners of 1910 took this passage:

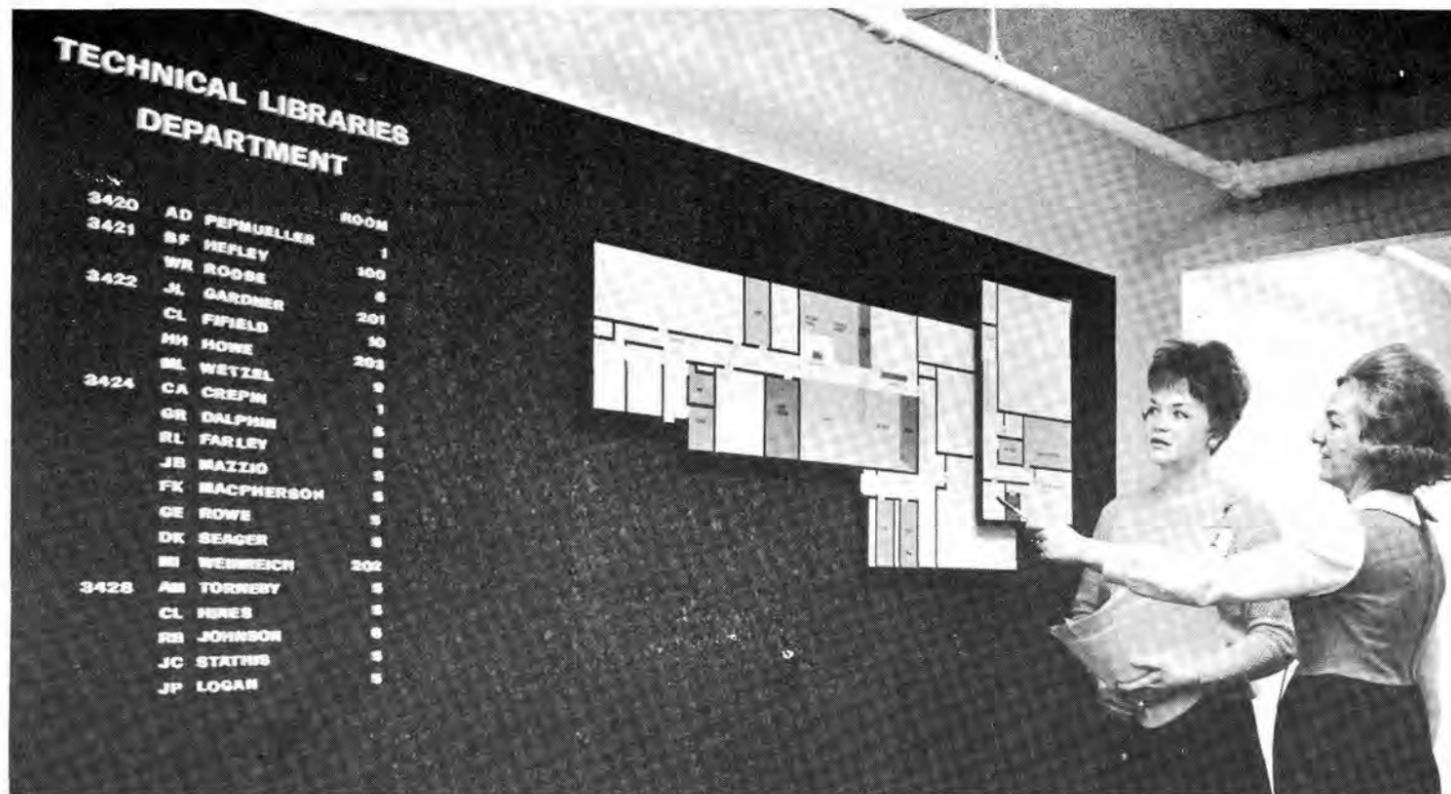
"In connection with this subject of gun carrying, it is a question if the best method of licensing hunters is not by gun license in place of the present method (by hunting license)."



RADIOGRAPH, left, provides a different image from x-ray, right. Various components of Princess telephone base are visible in one and not in the other. Because of sensitivity to carbon and plastics, Division 7361 uses radiographs in nondestructive testing of items using these materials.



New Look at The Technical Library



WHERE'S WHAT in Bldg. 804 can be seen at a glance at either entrance where colorful floor plans are displayed. Hazlet Edmonds (left) and Freddie Weber, both of Technical Libraries Department 3420, know where they are.



THIS CENTRALIZED CIRCULATION DESK combines the two functions previously maintained for books and reports. Pat Chisholm is helping Paul Percy (5114). At the back of the room Paul Bonaparte (2325) is using the microfiche reader-printer. Middle of the room are (l to r) Nell Arnett, Priscilla Archibeque, and Veronica Dostert.



GENERAL INFORMATION DESK, being covered here by Kate Young, is basically designed to give assistance on books and periodicals. Jim Scott (9200) is using one of the computerized book catalogs, which replaced the former card catalogs. Behind him is the periodicals reading room, which offers convenience and quietness.



REPORTS READING ROOM plus a full-time reports information librarian are two new features. Margaret Wetzel's job is to help "customers," such as John Moore (3111), in using the reports catalog. The computer listing is more convenient than the previous card catalog and (best of all) requested reports are brought to employees.

Service Awards

25 Years



Charles Barnard
7600



Daniel Grim
1532



Robert Knapp
3350

20 Years



Levi Baca
4512



Charles Bild
7300



Horace Brown
4612



Richard Carlisle
4513



Neal Carpenter
2611



Cecil Land
5153



Clarence Loveless
8183



Wamon Cope
4622



Mary Criswell
7653



Jack Curran
8161



John Dobias
2345



Kenneth Gillespie
2320



A. L. Ouellette
5225



George Ray
2523



Marvin Guier
7420



John Gustafson
7511



D. D. Hesselbarth
4612



H. A. Hinrichs
4518



Cecil Kinney
3417



Harry Kovaschetz
4213



Carroll Lowe
4542



Ernest Mares
4253



Richard Marquez
4232



Albert Marrs
7282



Elbert Mathias
4211



Norbert Molter
7613



Frank Murar
8182



Rollin Schneider
7654



Daniel Sheldon
1643



William Short
4518



Charles Spriggs
3417



Charles Stoner
2452



Edward Strance
4337



Marcial Valdez
4151



Orval Wallen
8311



Bill Yoder
2491

10 Years

Russell Dietzel 2346, Roger Busbee 8183, Ronald Husa 2353, Michael Zapach 7424, Carolyn Eckart 3256, William Geck 3454, Wesley Pfanner 9211, Zelma Creager 8264, Merton Robertson 5525, Hans Birbaum 8163, Emile Wittebort 8257, Kathryn Walter 3256, Elsie Upchurch 3313.

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15 Years



Jim Arnold
9241



John Ayala
4513



Manuel Cordova
7523



Leon Filvin
7614



Cecil Land
5153



Clarence Loveless
8183



A. L. Ouellette
5225



George Ray
2523



Ben Seely
5521



William Stolpun
7611

Authors

E. J. McGuire (5234), "K-beta/K-alpha X-ray Intensity Ratios," Vol. 33, page 288, PHYSICS LETTERS A.

R. L. Fox and R. S. Bernard (both 9341), "A Tractable Method for Estimating Atomic and Molecular Transport Coefficients," AIAA JOURNAL, Vol. 8, page 2085.

H. H. Baxter (4542), "Piston Hood Saves Plant Air," Dec. 10, issue, PLANT ENGINEERING.

D. E. Merewether (2627), "Analysis of the Shielding Characteristics of Saturable Ferromagnetic Cable Shields" and "Design of Shielded Cables Using Saturable Ferromagnetic Materials," Vol. EMC-12, No. 3, IEEE TRANSACTIONS ON ELECTROMAGNETIC COMPATIBILITY.

Bruno Morosin (5131), "The Wurtzite z Parameter and Linear Compressibilities for NH₄F," Vol. 26, Part 10, ACTA CRYSTALLOGRAPHICA.

J. E. Powell (5223), "Fast Neutron Spectrum Measurements in the MTR Scandium and Iron Filtered Beams," Vol. 87, No. 1, NUCLEAR INSTRUMENTS AND METHODS.

P. B. Bailey and F. R. Norwood (both 1721), "Stability of Magnets Moving Above a Conducting Plane," Vol. 41, No. 12, JOURNAL OF APPLIED PHYSICS.

R. G. Easterling (1643) and D. L. Weeks (Oklahoma State University), "An Accuracy Criterion for Bayesian Tolerance Intervals," Vol. 32, No. 2, JOURNAL OF THE ROYAL STATISTICAL SOCIETY, Series B.

R. T. Johnson (5132), "Beta- and Gamma-Induced Conductivity in Semiconductors: Application to CdS Neutron Detectors," Vol. 41, No. 12, JOURNAL OF APPLIED PHYSICS.

P. D. Thacher (5153), "Electro-Optic Coefficients of Pb-Containing Oxygen-Octahedra Ferroelectrics: Ceramic (Pb, Ba)(Zr,Ti)O₃," Vol. 41, No. 12, JOURNAL OF APPLIED PHYSICS.

W. E. Wilson (2633), "An Analysis of the Heat Pipe as a Heat Sink for Solid-State RF Sources," Vol. ED-17, No. 11, IEEE TRANSACTIONS ON ELECTRON DEVICES.

Sympathy

To Jack Rich (3524) for the death of his daughter, Dec. 25.

To Elden Prawitz (4612) for the death of his father in Klamath Falls, Ore., Dec. 29.

SHOPPING CENTER

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

TV, 21", \$45.00. Sanchez, 268-5940.

CAMERA, Kodak movie #D105, 8mm, w/1 roll film, cost \$30, sell for \$9; Kodak Starmite II #485, uscs #127 film, cost \$8, sell for \$3.50; size 5 women's Hyde ice skates, \$15. Ristine, 298-8383.

BOY'S SUIT, Penneys, worn twice; approx. 130 lbs., & 5'5" tall, \$45. Benton, 877-2475.

HEAD MASTER SKIS, 7'. Brooks, 299-0923.

'69 YAMAHA 175 Enduro, 4400 miles, complete G17 kit (head & exhaust system). Denison, 255-3535.

HEAD MASTERS 215 cm; trailer meter & 60 a fuse box; 8-hole wheels for 17.5" tires, fit Ford, Chev. Souder, 282-3121.

RUG, 12x14 gold nylon, 11 mos. old, \$65; beige hand printed drapes, 88x88, \$15; accurate black bathroom scale, \$5. Philbin, 266-4942.

LADY'S WIG, Dutch Eoy style, medium brown, Penney's color six, worn once. Randall, 299-0372.

JAPANESE 7.7 military rifle, \$25; colt .25 auto. pistol, \$50; trade for swords or daggers. Smitha, 299-1096.

BICYCLES, Schwinn 26", one red, one blue, 2-spd., 2-wheel brakes, coaster rear, heavy duty tires, tack proof tubes. Lackey, 255-7901.

FREE: pet rabbit and hutch to someone who will give him a good home. Stark, 8212 Pickard Ct. NE, 299-5953.

BABY TENDA w/top, pads, & harness, \$5; bed spreads for twin size beds. Bentz, 299-3448.

18 MONTH OLD stud colt, \$100. Wheeler, 282-3321.

LAZY BOY LOUNGE CHAIR, needs upholstering, \$15. Miller, 268-5992.

SNOW TIRES, 6.00x15, just recapped, will fit VW & many sport cars, \$10 ea. Huguen, 296-2600.

GUITAR, electric w/amplifier, \$35. Gallagher, 268-1988.

TWO HEADER NORELCO shaver, \$12. DeLorris, 299-5384.

HAMILTON electric men's wrist watch, round gold filled case, recently reconditioned w/new band, \$25. Bear, 298-2744.

'64 Plymouth, Valiant service manual, \$1.75. Nelson, 264-1674.

WROUGHT IRON fireplace screen, 40"x30", Studler, Magnani, 299-8693.

FRENCH provincial step-end table, cherry/fruitwood, \$20. Harper, 268-8357.

CAMPER, 8' "Apts. for Pickups" needs some wood replacement, includes Coleman ice box, stove, mattress, gas & elec. lights, \$200; heavy-duty A-frame tow bar, 2 5/16 ball, \$22. Feltz, 296-4578.

COLT Scout w/magnum cyl., \$55; single action .45 Colt revolver, \$65; high std. Sentinel, \$42; Rem. 513 target Redfield sights, \$55; want dbl. barrel shotgun. Svensson, 344-7700.

SKI BOOTS, Raichle Reds size 11M, used twice, too tight, cost \$140, sell for \$85; 21" RCA TV, works but no cabinet, \$25. Shummy, 265-1620.

TRAILER axle w/hubs, wheels. Campbell, 268-8445.

CARS & TRUCKS

'59 HILLMAN station wagon, 4-spd. trans., R&H, new starter, \$75. Bell, 299-4643.

'60 FIAT 1100, white w/brown top, \$200. Lunsford, 344-3142.

'62 CORVAIR 4-spd., \$125. Gleicher, 296-0105.

'70 PLYMOUTH 'Cuda, V8 383, 4-spd. on floor, tachometer, low mileage, \$400 plus take over payments of \$86/mo. Arterburn, 299-3620.

JEEP, Universal, Willys, 4-wd, tow-bar, 12-volt, '53 rebuilt engine, cab, 2 gas tanks, heater, spare, \$600 or trade. Scott, 299-3412.

'67 PONTIAC Firebird, R&H, PS, below book. Williams, 298-2671.

'62 MERCURY Monterey, 4-dr., V8, AT, AC, one owner, \$500. Gallagher, 268-1988.

'59 CHEV., 6-cyl., overhauled engine. Lezza, 636-2216.

'63 PONTIAC Grand Prix, needs body work, AC, \$395. Hedman, 299-2077.

'65 VW squareback, \$975 or will trade for pickup truck. Johnson, 255-5427.

'67 VW squareback, new valves & carb kits, \$1250. Timmerman, 298-4587.

'64 FLYMOUTH, 58,000 miles, new tires, AC, PS, \$650. Syme, 298-9167.

WANTED

FORD pickup wheels, 16", 8-hole, 2-piece rims. Souder, 282-3121.

20" BICYCLE, either type, must have good wheels. Reineke, 344-5138.

PICKUP OR 4WD in good condition, any year, pay up to \$1000. Trefa, 299-2765.

HEATER DEFROSTER for '57 Chev. station wagon. Marsh, 243-2767.

LIVE IN HELP, housekeeping and baby care for 2 to 3 months. Carli, 298-9271.

TRADE some summer use of my Conchas houseboat for some skiing accommodations at any N.M.-Colorado ski areas. Westman, 255-6048.

FOR RENT

SMALL mountain house, 1-bdr., fp, view, 13 miles to Sandia Lab. available Feb., \$90/mo. Souder, 282-3121.

Stage Show, Movie Manana; Casino Night Set Jan. 23

Tomorrow night is family night at the Coronado Club with a stage show and a classic comedy movie scheduled.

The Tony Baca family from Belen will perform starting at 7 p.m. This crew of talented singers, musicians and dancers will present a variety of entertainment ranging from classical Spanish to modern rock.

After the stage show, "Abbott and Costello Meet the Mummy" will be shown along with two chapters of the old Bela Lugosi serial "The Phantom Creeps."

Steak sandwiches at \$1.15 will be available and happy hour prices will be in effect all evening. Admission is free to members.

Casino Night

On Saturday, Jan. 23, the Coronado Club will be turned into a Las Vegas-type casino with assorted games of chance. Play money will be issued at the door when the \$1 admission fee is paid. At the close of the evening, the big winners will receive prizes.

Elton Travis and the Westernaires will play country western music for dancing from 9 to 1 a.m. French dip sandwiches will be available.

Social Hours

Tonight the Club's famous chuckwagon roast beef will be the buffet feature while The Four Keys play for dancing.

Social hours start right after work on Friday evenings with special prices in effect until 9 p.m. The buffet is spread from 6 to 8 p.m. and the band plays for dancing from 6 to 9 p.m.

Then the troops move into the main lounge where Yolanda Adent and piano entertain with a sing-along until midnight.

On Friday, Jan. 15, Club manager Jim Noonan will concoct his special Italian food with the mama mia sauce for the buffet. Wildman Bob Banks will be on the bandstand with his red Yamaha electronic organ and the trio.

Sol Chavez and the mighty Duke City Brass will return to the bandstand on Friday, Jan. 22. The Club's special veal cutlet buffet will be spread.

Soul Session

Freeman Lacey and the Mark IV will play it big rock modern for the Soul Session Saturday, Jan. 30. The bash starts at 8:30 p.m. and runs past midnight with happy hour prices in effect all evening. Admission is free to members, 50 cents for guests.

Bridge

Coronado Ladies bridge will meet Thursday, Jan. 21 at 1 p.m. Duplicate bridge meets Tuesdays at 7 p.m.

BAHAMAS TOUR GROUP will meet Tuesday, Jan. 12, in the Club dining room to show slides and movies of the recent trip. Projectors will be provided. All Club members are welcome to attend the session.

Chet Fornero (4337), travel director, will discuss possibilities for the next major Coronado Club travel package.

CORONADO SKI CLUB will also meet Tuesday, Jan. 12, to hear Karlo Jokela discuss ski maintenance. He will demonstrate using the Ski Club's new ski maintenance workbench (available for loan to members). Bill Horton of the Ski Patrol will discuss safety aspects of ski bindings and maintenance regulations. A short film, "Ski Adventures," will also be shown.

Events Calendar

- Jan. 9—Afternoon hike in Juan Tabo Canyon. N.M. Mountain Club, leader Dorothy Clark, tel. 247-9741.
- Jan. 10—Snowshoe/ski tour on North Peak. N.M. Mountain Club, leader Bob Babb, tel. 256-9016.
- Jan. 10—UNM Chamber Orchestra, 4 p.m., Popejoy Recital Hall.
- Jan. 14-17, 21-24—"The Wager," Old Town Studio.
- Jan. 15—Albuquerque Symphony Orchestra, Mary Costa, soloist. Popejoy Hall.
- Jan. 16—Wally Tabor wildlife films, Popejoy Hall.
- Jan. 16—Snowshoe in the Sandias, N.M. Mountain Club, leader Peter Harris, tel. 898-3600.
- Jan. 22—Neil Simon's "Plaza Suite," Popejoy Hall.
- Jan. 23—Community Concert series presents Szymon Golbert and Victor Babbin, violin and piano duo-recital, Popejoy Hall.



CASINO NIGHT at the Coronado Club Jan. 23 will feature play money and Las Vegas-type games of chance. Big winners will cash in for real prizes. Lady Luck is Nadine Ortiz (3522).

Maxi-Tour With CB

Snake-in-the-Purse Is Better Than Hijacker on Plane

LAB NEWS staff writer **Cherry Burns**, who usually writes "mini-tour" articles, returned recently from a "maxi-tour" vacation. This is Part Two.

Iran looks like no other country from the air: mud colored, convoluted, barren. At ground level it looks even worse: large flocks of sheep roaming on land devoid of even tumbleweeds. The extreme barrenness was probably caused by centuries of overgrazing.

But if the countryside is bleak, the towns with their elaborate mosques and lovely Persian roses more than make up for it and the people provide many surprises.

The few women you see on the streets are well-covered with veils that reach to their ankles, but the veils are somewhat transparent and beneath them you can frequently glimpse mini-skirts. Despite Moslem attitudes, Iranian women are gradually gain-



FRIENDLY-TYPE CHINESE found near the Hong Kong-China border. Housing demands for the tremendous influx of Chinese refugees is gradually being met by the Hong Kong government.



HONG KONG-CHINA BORDER, near Lok Ma Chau in the New Territories, is guarded by these Hong Kong policemen. A narrow river divides the rice paddies of the two countries. Canton is only 40 miles away.

W. S. Saric (9341), "Nonlinear Kelvin-Helmholtz Instability"; R. L. Fox (9341), "Study of the Decay of Isotropic Turbulence Using the Multipoint Distribution Functions," 23rd Meeting of the Fluid Dynamics Division of the American Physical Society, Nov. 23-25, Charlottesville, Va.

R. A. Hill (9342), "Stark Broadening of H_β, H_γ, and H_δ: A New Comparison of Theory and Experiment," 1970 Annual Meeting of the Division of Electron and Atomic Physics of the American Physical Society, Nov. 23-25, Seattle.

J. L. Mortley (7524), "Review of Existing and Proposed Minicomputer Applications for Environmental Testing,"; W. W. Shurtleff (7524), "Some Automated Tester Techniques for Environmental Testing," 19th Meeting of the IMOG Subgroup on Environmental Testing, Dec. 2, St. Petersburg, Fla.

H. D. Sivinski (1740), "Some Applications of Computerized Biomodeling to Planetary Quarantine Problems," Biomathematics Seminar, Dec. 8-9, Iowa State University.

D. R. Parker (3311), "Solid Chemical Waste Disposal at Sandia Laboratories," DASA/FC Symposium, Dec. 3, Albuquerque.

Coronado Aquatic Club Seeking New Members

The Coronado Aquatic Club is seeking youngsters interested in participating in all phases of competitive swimming, particularly diving. The Club will be holding try-outs through January, according to Julian Lovato (7615), president. Anyone interested in enrolling their youngsters is urged to contact Julian, tel. 299-1375.

Speakers

W. N. Caudle (9327), "Terradynamics at Sandia Laboratories," Arnold Research Organization, Inc., Dec. 4, Arnold AF Station, Tenn.

G. G. Wilson and W. A. Millard (both 9325), "Performance and Flight Characteristics of the Sandhawk Family of Rocket Systems"; D. Q. Matejka (9324), "Aeroelastic Bending of a Sounding Rocket Vehicle," 2nd Sounding Rocket Vehicle Technology Conference of AIAA, Dec. 7-8, Williamsburg, Va.

R. R. Prairie and I. J. Hall (1643), "An Application of Prediction Intervals to Product Acceptance," American Statistical Association Meeting, Dec. 27-30, Detroit.

A. D. Swain (1644), "Human Factors in Hazards Control," Lawrence Radiation Laboratory, Dec. 3, Livermore.

R. I. Ewing (5235), "Atoms, Radiation and Things," University Heights Optimists, Nov. 19, Albuquerque.

H. R. Shelton (3134), "Continuing Engineering Education in an R&D Laboratory," IEEE, Nov. 19, Albuquerque.

L. P. Robertson (3134), "On the Social Effects of Advancing Science and Technology with Particular Reference to the Job Market and Changing Needs of Employment," Rio Grande High School, Nov. 24, Albuquerque.

O. L. Wright (4610), "History of Sandia Base," Downtown Optimists Club, Nov. 27, Albuquerque.

Noble Johnson (3433), "Children with Learning Disabilities," Downtown Optimists Club, Dec. 4, Albuquerque.

Al Goodman (1224), "Some Things That the Future May Bring," Business Women's Association, Dec. 10, Albuquerque.

R. W. Russell (7523), "Lost but Not Forgotten," Mile High Optimists Club, Dec. 17, Albuquerque.

ing more rights, mainly in the areas of property ownership and participation in national politics.

The Iranians have firm attitudes about other things too. A newspaper article noted that since the country's Anti-Narcotics Act was enacted early in 1970, 60 persons had faced a firing squad (five heroin pushers were executed only a week before), 131 were serving life sentences, and 110 others were given 10-15 year sentences at hard labor.

I witnessed one exciting incident just before the 45 minute flight from Tehran to Shiraz (where one hires a car to go to Persepolis, the ruins of which date back to 520 B.C.).

Iran Air had already lost three planes to hijackers and was understandably sensitive about passengers. I had been forewarned via the travelers' grapevine (comparable to the Sandia grapevine) to check all baggage, even cameras.

The security inspection started at take-off time and ended two hours later. The frisking was thorough. I was standing beside a table with a German diplomat's wife and their nine-year-old daughter when the woman security inspector began to examine our purses. When the Iranian opened the girl's purse, out flipped a foot-long plastic snake. Pandemonium broke out. The Iranian woman appeared too scared to scream. One of the male security inspectors was undecided what to do. The mother kept repeating "It's a toy, it's a toy," but none of the natives understood her. I got the giggles and that broke the tension. The Iranians still looked dubious, but they let the German girl stuff the fake snake back in her purse and we all got on the plane.

Istanbul is probably the most beautiful



TO MAKE A STEEL FILE, Iranian bazaar style, you need a big toe to hold the metal a steady hand to make the ridges 1/32nd of an inch apart, and a charcoal fire and bucket of water for tempering purposes.



POSEIDON? Well, there's the rocket and there's this temple at the southern end of Greece.

large city I've ever seen, but I ended up seeing it longer than planned. When I arrived the effects of the cholera epidemic were still being felt and, even though I had the proper cholera inoculation, I faced a three-day quarantine before being allowed to enter Greece, my next stop. It took me several days to make up my mind where to go instead of Athens, but by that time the restriction had been lifted.

A few observations on some other places visited: Hong Kong, busy and crowded with atrocious new government housing for refugees (some of the high rise tenements have roof-top schools and playgrounds); Bangkok has gaudy temples and handsome people; Greece was considerably colder than it must have been when all those statues were carved; Nepal, discussed in my last article, the most charming and the highlight of my world tour.