

LAB NEWS

VOL. 22, NO. 18

AUGUST 28, 1970

SANDIA LABORATORIES - ALBUQUERQUE NEW MEXICO & LIVERMORE CALIFORNIA

New Sandia Benefit

Long Term Disability Income Plan Made Available to Employees

An addition to Sandia Laboratories employee benefits package will be explained at group meetings of employees starting next week. The addition is a long term disability income plan which will be made available to employees at low cost through payroll deduction. The plan is underwritten by the Equitable Life Assurance Society of the United States.

In essence, the plan will enable employees to purchase insurance which will guarantee an income equal to 50 percent of their regular Sandia income if they become totally disabled either on or off the job. The income would start six months after the injury or sickness (or whenever sick leave benefits expire) and continue as long as the employee is unable to work or reaches age 65.

Cost of the insurance varies according to the employee's length of service.

For those with less than 15 years service, the cost is 17 cents per \$100 of base monthly income up to \$650. Over \$650, the cost is 27 cents per \$100.

For employees with 15 or more years of service who are covered by the retirement income plan disability benefits, the cost is 12 cents per \$100 of monthly base pay up to \$650. Over \$650, the cost is 19 cents per \$100.

An example of the total cost would be an employee with less than 15 years service earning \$800 per month. His long term disability income insurance would cost a total of \$1.52 per month. If the employee had 15 years service, the plan would cost \$1.07 per month.

The long term disability plan will become effective Oct. 1 provided 75 percent of all regular full-time employees actively at work have signed acceptance cards.

Research in Surface Studies Theme of Sandia Conference

A number of Sandia papers will be presented during the Conference on Surface Studies to be held Sept. 9-11 at Sandia Laboratories.

The program covers a wide variety of research underway in the field of surface studies. Reports will be presented from Dow-Rocky Flats, University of Denver, Los Alamos Scientific Laboratory, Oak Ridge National Laboratory, Lawrence Radiation Laboratory, Physical Electronic Industries, and E. I. du Pont de Nemours.

Richard Schwobel (5330) is conference chairman and Jack Reichardt (2613) is program chairman.

Local papers to be presented are: Donald Mattox (5332), "Gases in Metal Films"; Ronald Ewing (5235), "Condensation of Iodine on Refractory Metals"; Douglas Loescher (5153), "The Oxidation of Erbium"; John Reichardt (2613), "Reactivation of Air Exposed Thin Film Getters" and "Hydrogen Titanium Reaction."

Jack Houston (5332), "Chemical Analysis of Solid Surfaces by X-Ray Appearance Potential Spectroscopy"; Robert Gerlach (5331), "Applications of Ionization Spectroscopy to Surface Analysis"; Robert Knauer (5151), "Surface Studies Using the Mossbauer Effect"; Wesley Estill (8311), "Comparison of X-Ray and Backscattered Electron Analysis."

Charles Tapp (2610), "Secondary Electron Emission from ErD, ScD, TaD₂, Bombarded by D in the Energy Range 50-140 KeV"; Leonard Beavis (2613), "The Interaction of Hydrogen with Stainless Steel Surfaces"; Arthur DuCharme (5331), "Near-Surface Charge Density in Metals"; and Osborne Milton (5333), "Surface Strength of Dielectrics."

Computer Contains Nuclear Blast

Les Hill Shakes Mountains

The walls of Les Hill's office in Bldg. 806 are papered with computer printout. Stacks of the computer runs are piled everywhere. On a clear space at his desk, Les is pouring over a printout trying to determine the effectiveness of various stemming designs.

"Stemming design" is a phrase to describe the techniques used to contain underground the radioactive fission products resulting from a nuclear test. It is much more complex than closing a tunnel with a strong enough plug to stop the blast waves and debris.

A typical tunnel for an underground test contains a number of chambers for instrumentation and experiments, various doors and plugs, plus drill holes for cables.

Many variables covering enormous ranges — millions of psi pressure and thousands of degrees Kelvin, where Hugoniot and release adiabats are important, to psi pressures and ambient temperatures, where the fracture of rocks and naturally occurring perturbances such as faults are of concern — must be considered to make sure that the nuclear explosion is completely contained underground and that useful data are derived from the test.

As needs for the associated experiments change with the tests, new stemming designs must be considered. This is a portion of the work of Test Sciences Department 9110 under Carter Broyles.

Stemming design is based upon accumulated experience of years of underground testing plus the best computer simulation available. Only within the last two years has it been possible to effectively simulate an underground nuclear explosion with detailed computer calculations. Development of hydrodynamic computer codes, "hydrocodes" — lengthy complex systems of partial differential equations in finite difference form reflecting the physical laws of conservation of mass, momenta, and energy — has made simulation possible. Development of the codes also required greater capacity in computers. At Sandia, the extended memory unit of the CDC 6600 computers has facilitated hydrocode computations. A typical hydrocode problem requires a minimum of one-half-hour but more often eight to 12 hours of computer time.

The work of Marshall Berman (9112) in simulating underground nuclear tests was discussed in the June 19, 1970, issue of the LAB NEWS. His program is used to simulate a test from the time of detonation for a fraction of a micro second. To be comprehended by the scientist, the results are depicted in color movies showing changes in temperature, density, pressure and position. This geometric simulation uses a Lagrangian hydrocode.

Nick DeLollis Book Discusses New Adhesives Technology

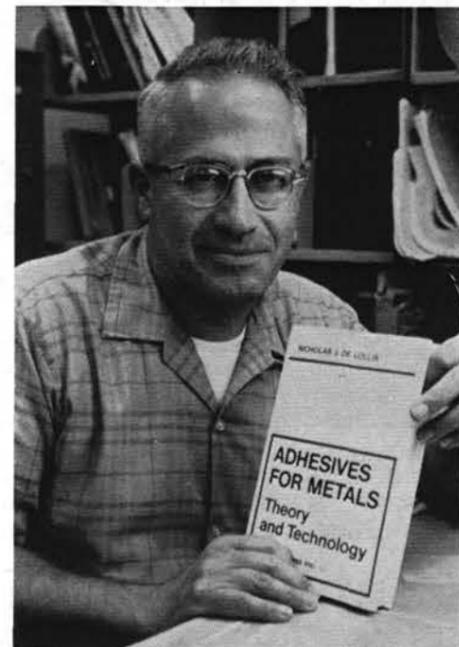
Until the 19th Century, Americans were using adhesives obtained from the same sources known to earliest man: animal hide, hoof, bone and blood proteins, and tree gums, casein, or starches. The change to adhesives of synthetic resins brought about entirely new technology.

Some of the latest information is discussed by Nick DeLollis (5333) in his new book "Adhesives for Metals — Theory and Technology," recently published by Industrial Press Inc.

The book gives information about adhesion, adhesive chemistry, and materials and bonding practices, then goes into theories of adhesion and the new outlook on the mechanism of bond failure. Initial forces of adhesion on the mechanism of bond failure is discussed as well as the importance of adhesive sealants in stress relief and vibration damping applications.

The book contains graphs, tables, drawings, and photographs of practical applications.

Nick has worked with synthetic resins and adhesives about 25 years, and data accumulated during his 14 years at Sandia Laboratories is included in the book.



NEW BOOK on "Adhesives for Metals" is proudly displayed by author Nick DeLollis (5333).

Will Teach This Fall

Universities Borrow Top Mathematicians

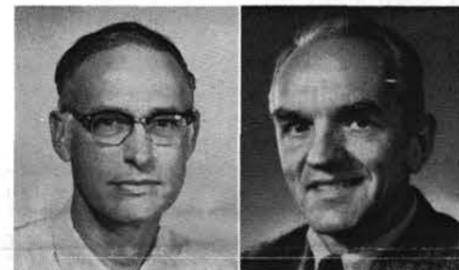
Two mathematicians will join university faculties this fall.

George Steck of Statistical Research Division 1723 will be teaching at Oregon State University in Corvallis, and Howard Wicke, supervisor of Applied Mathematics Division I, 1721, will be on the faculty at Ohio University in Athens.

While on his temporary assignment as a visiting professor in the Department of Statistics, George will teach courses in non-parametric statistics and in computer simulations. The latter will be based upon studies he carried out for JTF-2 several years ago.

George feels that the change will be beneficial in that he can expect mutual interest in unsolved problems and an opportunity to become updated on areas of general mathematical interest. "I've been out of touch with present day teaching," he says, "and it will be exciting to be on campus."

Howard will also instruct graduate courses in mathematics, mainly topology. He feels that he will gain by having in-



George Steck

Howard Wicke

creased contact with professionals in mathematics and other fields. He is also looking forward to an opportunity to do some writing.

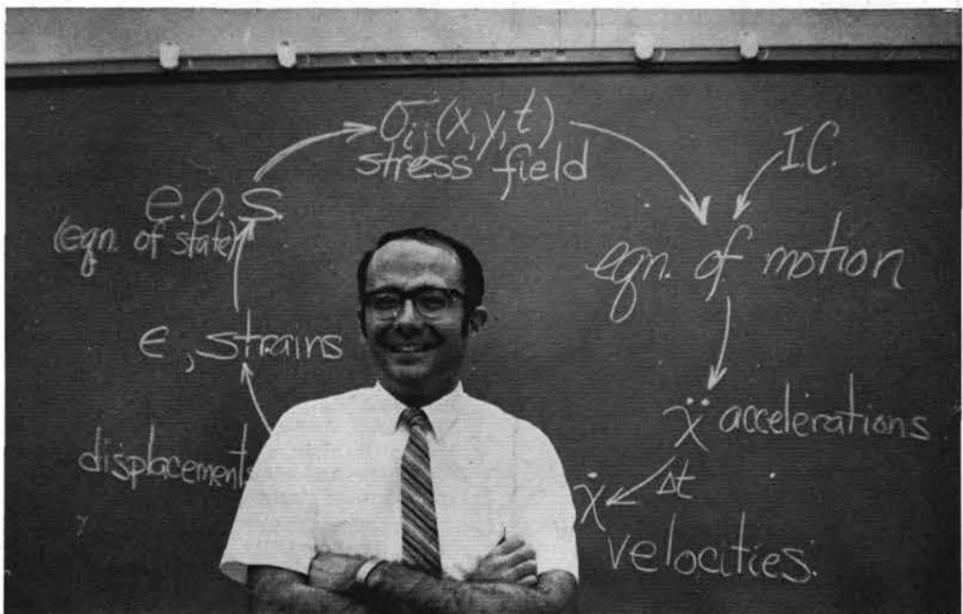
Both agree that Sandia will benefit from contacts they will make on campus and that the students will receive a more realistic idea of the role of mathematicians in industry.

In the Lagrangian code, the zones tend to pass through each other after the computer takes the event through the tremendous number of computations required for nuclear blast simulation. At some point, due to zone distortion and turbulent inter-

action, the scientist loses confidence in the results.

Starting at the last confidence point, Les Hill (9111) then calculates with Eulerian hydrocodes what happens during the next few hundreds of microseconds and

(Continued on Page Two)



LES HILL (9111) diagrams the "feedback loop," part of the Eulerian hydrocode, which makes possible computer simulation of underground nuclear tests.



THE MAN WITH MORE SECRETS THAN ANYONE, Jim Marsh, head of Sandia's Classification Division 3414, has been elected president of the National Classification Management Society. The 250-member Society was organized at Sandia six years ago.

Confidentially, Jim Marsh Has This Thing About Classification

Jim Marsh is head of Sandia's Classification Division 3414 and was recently elected president of the National Classification Management Society—a group which got its start at Sandia back in 1964.

Given the size of our defense effort and the technology which it represents, classification is a pretty big business in itself. Within AEC alone, in addition to its classification staff, each integrated contractor maintains a classification office. The De-

partment of Defense and the various services have an even larger group of classification people. This wide-spread activity led to the formation, in 1964, of the Society to whose presidency Jim has been elected. The 250 or so members publish both a bulletin and a journal, and meet with each other regionally and nationally.

Jim joined Sandia in September 1951 working first in engineering methods. He transferred to budgeting and then to classification in 1957, becoming supervisor of the division in 1960.

"NCMS (the Classification Society) has precisely the same aim as any other professional group—to increase the competence of its members," Jim states. "With Sandia's role expanding into activities under reimbursable contracts with other than AEC agencies, it becomes important for personal contact between professional classification people in all government agencies. The Society provides a background for working relationships."

Hear! Hear!

Somebody reads the LAB NEWS.

At least Rupert McHarney (3417-3) attributes an article which appeared in the July 2 issue as the source of information for a letter which appeared in his mailbox this week.

The letter: "Dear Mr. and Mrs. McHarney: Your splendid service to the Navajo people of the Huerfano area has come to my attention and I want to commend you for your excellent work. I am sure that the success of your programs will inspire many other citizens to undertake similar efforts. The enclosed certificate is a token of my appreciation for your compassion and dedication in serving those in need. It comes to you with every good wish for the years ahead. Sincerely, Richard Nixon."

The McHarneys have worked closely with the Navajos for several years — conducting summer Bible school and providing a home for some Indian children.

Credit Union Statements

As part of its normal audit procedure, the Supervisory Committee of the Sandia Laboratory Credit Union recently mailed statements to members with account numbers from 0 to 2999. If your account number is in this series and you have not received your statement, please notify Karl Waibel (4117), Committee Chairman.

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Continued from Page One

Les Hill

ultimately for many milliseconds when the shock has gone hundreds of feet in the ground. Rather than moving geometric zones, an Eulerian code provides a stationary grid through which the simulated material passes. The results here again can be converted to movie film and the picture of the simulated underground test continues.

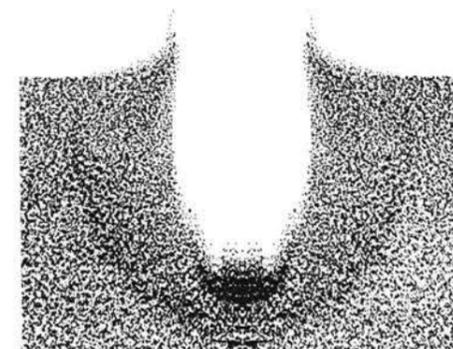
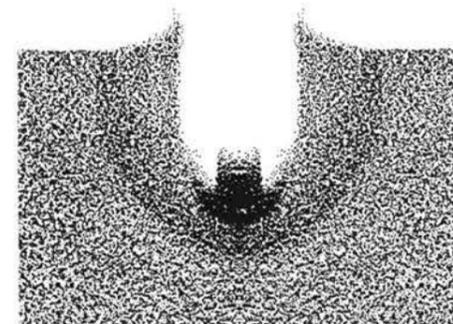
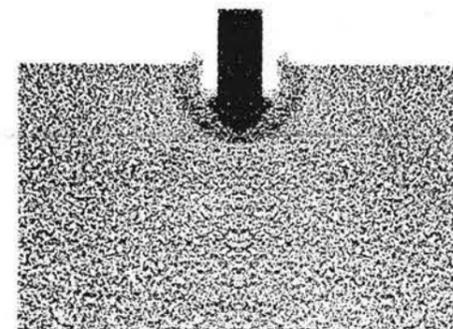
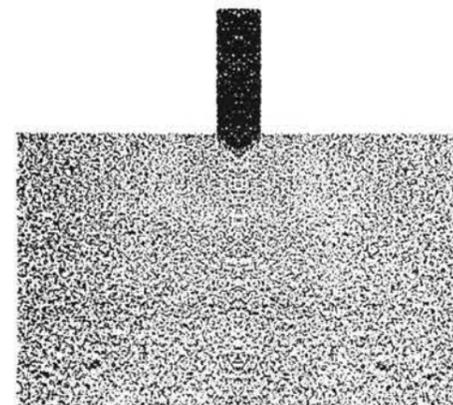
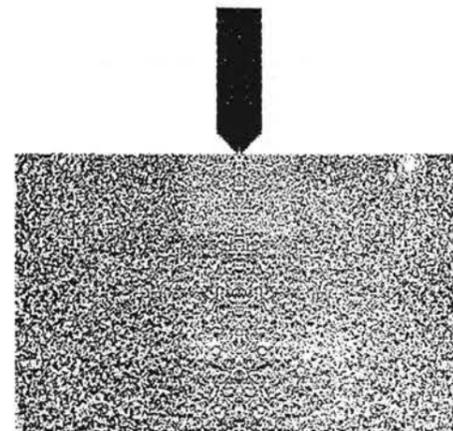
Film produced by the computer continues to show the forces at work in the tunnel and the surrounding mountain. Material with higher density becomes dark shading on the screen. Lower density is shown in various shades of gray. Shock waves traveling through the material are clearly visible. Les has programmed the breakup of the "chimney" which forms above the cavity and plans to study the collapse of this mass of rock into the cavity as the gases cool.

Les is enthusiastic about the uses of the Eulerian codes. "They can be adapted to any number of scientific problems," he says, "and produce useful results." Les earned his PhD in theoretical and applied mechanics at Princeton. Shock waves in materials is a special field of interest.

"We take the simulation as far as we can on the computer," Les says. "Here again, Eulerian codes become suspect after the 'feedback loop' has been computed 10,000 times or more — simple rounding off of numbers creates an eventual loss of confidence."

The feedback loop is the system of equations relating changes in the stress field — equations of motion, acceleration, velocity, displacement, strain, and material equations of state. Each change affects the next equation and the computer keeps running through the loop.

Still, the simulation is a tremendous achievement. Various stemming design innovations can be tried by computer before risking an actual test. Slight changes can be scrutinized and many variations can be tried. This provides the designers of the test valuable information, available from no other source, which contributes significantly to the success of underground nuclear testing.



FRAMES from a computer movie show a steel projectile penetrating shale. This is an example of the results from an Eulerian hydrocode.

For High School Graduate

Occupational Training Courses Fill Need in Educational Plan

"Well, you've graduated from high school, so what?"

That question might be asked by a prospective employer when an untrained, unskilled 18-year-old applies for a job. It could also be asked by a parent, disgruntled because the young graduate shows no inclination to enroll in college. And it could be asked by one student of another in questioning future goals.

Experts in education estimate that two-thirds of the students going after a bachelor's degree would have been better off going for a two-year associate degree or into technical institute-type training. This figure does not include the students who didn't even give college a try.

Many Sandians have children in the 18-year age group and should be aware of information about occupational training and schools available. The Sandia Technical Library is a good source for specific information.

"Why don't you want to go to college?" Well, discounting current unrest on college campuses and any purely economic reasons, the most prevalent reply is "I don't know what I want to do." This is true of both boys and girls. In addition, many girls would rather get married, and a number of boys (as well as girls) would like to be on their own for a year — away from parental pressures and protection — to find themselves and make their own decisions. They may elect to go to college after that. And there's a growing minority that just plain questions the importance of college and attending simply to gain a middle class status symbol.

The strong point of an occupational school is the ability to give a person two years (or less) of intensive training and place him in industry — cutting the time lag between the educational experiences in a classroom and a job.

The range of careers possible through

occupation training schools is widely varied and constantly changing. When one realizes that 80 percent of the labor force is working on jobs that did not exist 30 years ago, the importance of awareness of changes in industry and the economy is obvious.

In New Mexico there are more than 40 career and vocational schools offering training in business, business machines, trade and technical subjects, practical nursing, computer technology, secretarial subjects, beauty culture, and commercial flight training.

On a nationwide basis, training courses are offered in such diverse subjects as aircraft mechanics, auctioneering, building construction technology, court reporting, dressmaking, floral design, forestry and conservation, hotel and motel management. Many schools have strong programs in medical technology (medical technicians, dental assistants, laboratory assistants, etc.) as this is one of the areas of high demand for graduates.

There is also a strong trend in universities to offer a two-year associate degree in specific fields of applied science (both physical science and engineering fields).

As to means for the schools to establish a necessary rapport with industry, many technical institute faculty members take summer jobs in industry (Sandia Laboratories employs some of these teachers each summer). In other instances the occupational education school works closely with representatives of a particular town or industry to train employees to fill a particular need. In fact, many such schools keep an almost perpetual inventory of manpower needs for counseling purposes and placement of graduates.

So, if your high school graduate doesn't want to go to college, maybe a vocational school would be the happy answer.

Sandian Writes Portions of Analytical Chemistry Text



Hal Brumfield

A series of books titled "High Polymers," published by John Wiley and Sons is a well known textbook in colleges and is a basic reference source in industry.

Recently, a new book in the series, "Analytical Chemistry of the Polyurethanes," has come

out, authored by D. J. David and H. B. Staley, chemists of Mobay Chemical Company, Martinsville, Va.

The new book attempts to bring together analytical procedures which have proven useful and applicable to the various phases of urethane chemistry. Several portions — a total of approximately 20-25 pages — of the chapter on isocyanate deviates were contributed by Hal Brumfield of Materials Division 8311.

Hal has been involved in studying the spectra of a number of urethanes, ureas, and the isocyanate reaction products of these materials. From basic correlations, common to the spectra studied, he devised a method to quantitatively measure the amounts of various group contributions in a compound, singly or in mixtures. The approach was to determine the contribution for each type of structure and its absorption wave length.

Hal's portion in the chapter set forth this method, with examples for the calculation of various formulas. Included are actual bond frequency assignments for the infrared spectra, along with infrared spectrum charts for specific compounds.

Since joining Sandia in August 1958, Hal has worked in the Materials Division. He has been involved with organic compounds and plastics, studying polyurethane reactions and developing polyurethane formulations and the characterization of their structures. Previously, he was senior project engineer for the plastics and rubber division of Underwriter's Laboratories in Chicago for eight and a half years. Hal has a BS in chemistry from Knox College, Galesburg, Ill., and has done graduate work at Northwestern University in organic chemistry.

Sandia Receives National Safety Council Awards

Sandia Laboratories Livermore recently received two safety awards from the East Bay Chapter of the National Safety Council.

One award — the Major Award — was given for having the lowest accident frequency rate (0.00) among East Bay firms working from 1.2 to 2 million man-hours in 1969.

The second award — the Division Award — was given for the lowest accident frequency rate (0.00) among seven East Bay research and development firms.

Take Note

Bert Barker of Computing Division 8322 presented a technical paper at the Forum of Control Data Users, held recently at St. Paul, Minn. His paper was titled, "FORTRAN Subroutines for CDC 3600 COBOL Programs."

Hartmut Spetzler of Materials Division 8311 was one of the speakers at the Gordon Conference in High Pressure Research held recently at Holderness School, Plymouth, N.H. His presentation was on "Acoustic Velocities in NaCl at High Temperature-High Pressure."

Schedules listing Chabot College's Autumn Quarter evening classes at Livermore are now available from Employee Benefits. Among the classes being featured are Conversational French and Conversational Italian, which will be offered on a Credit-No Credit Basis or may be taken for a letter grade. Courses taken on a Credit-No Credit Basis allow students to explore certain areas without undue concern for their grade point average.

Registration for new and returning evening students in the Livermore program will be held from 6:30 to 9 p.m., Sept. 15, in the Granada High School multi-purpose room. Classes begin Sept. 21.

Enrollees must be high school graduates or over 18 years of age. There is no tuition for California residents, but students must purchase their own books and supplies.

Su Chiu of Analytical Mechanics Division 8352 was the author of an article, "Stiffnesses of an Elastic Filler Constrained Between a Rigid Sphere and a Rigid Ellipsoidal Shell," which appeared in the June issue of the JOURNAL OF THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS.

Role of Nuclear Weapons In Europe Subject Of Sept. 1 Colloquium

"The Role of Nuclear Weapons in Europe" will be the subject of a colloquium to be held at Sandia Laboratories Livermore Sept. 1. Robert Shreffler will describe the efforts being made in the NATO Nuclear Planning Group for the use of nuclear weapons in the defense of NATO Europe in this video-tape presentation. The particular role of the United States in the exposition and resolution of the problems raised is emphasized.

A former director of the NATO Planning Directorate, the speaker is presently an Alternate Division Leader of the Weapons Division at Los Alamos Scientific Laboratory. He received his doctorate in 1949 from the University of Michigan and was associated with LASL from that time until 1960. From 1960 to 1961 he was a physicist with Dow Chemical Company, returning to LASL in 1961.

Tickets will be required for admission. Carl Furnberg (8157) is host.

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SANDIA LABORATORIES

AUGUST 28, 1970



SMASHED AUTOMOBILE shows tremendous impact suffered recently by four Sandians in an accident near Livermore. The accident could have been fatal but for the seat belts the four employees were wearing.

Seat Belts Save Lives of Four Sandians in Accident Near Livermore

"Four Sandians are alive today because they used seat belts," says Scotty Romine, safety engineer in Division 8263 who investigated the recent automobile accident which occurred on Interstate 580 near Livermore.

Bob Christopher (7423), Jim Clabaugh (7423), Eldon Frame (7421), and Chuck Smith (7421), on business trips from Sandia/Albuquerque, were traveling from San Francisco International Airport to Livermore in a rental car at approximately 11:45 p.m. Bob was at the wheel, proceeding east in the right hand lane at about 60 mph.

Suddenly another vehicle heading west on IS-580 crashed through the bushes in the center of the median strip, crossed into the eastbound lane of traffic, and headed for Bob's car. Swerving left into the eastbound fast lane, Bob tried to put himself on a parallel course with the other vehicle and slammed on his brakes — but was unable to avoid a collision. The right front of the second vehicle struck the right front of his vehicle, doing extensive damage to both vehicles.

All of the Sandians involved received

injuries to some extent as a result of the accident. They were taken to a local hospital for treatment.

"Each of the four remained in the automobile at impact, and I'm convinced," says Scotty, "that if it hadn't been for the seat belts they were wearing, they would have been thrown out. I'm sure the belts saved their lives. The National Safety Council has estimated that the chances of surviving a serious motor vehicle accident are increased nearly 100 percent if seat belts are properly installed and worn."

Scotty says that there have been only three accidents involving Sandia Laboratories Livermore rental cars during fiscal year 1970, and that accidents involving government motor vehicles at Livermore have hit the lowest mark in three years. "For fiscal year 1970, the number of these accidents totalled six, while there were 10 in both fiscal years 1969 and 1968," he says. "The costs involved have, likewise, been less."

The frequency rate (accidents per million miles) for government motor vehicles is down to 5.75 for FY '70, versus 10.15 for FY '69 and 12.45 for FY '68.

Joe Bradshaw Active in Little League Across the Country

Joe Bradshaw (8125) has devoted one 365-day span — broken up over 20 years — to the betterment of Little League in the United States. He was recently awarded a trophy by the Livermore National Little League in recognition of his years of service to the program.

When presenting the trophy, the president of the Livermore league noted that Joe has worked on every phase of the program and seemed to enjoy every minute of it. "With a little courage, pride, fortitude, and desire to see boys grow into fine young men, any man can do what Mr. Bradshaw has done for the past 20 years. There will be many mistakes, heartbreaks, and joys pass before your eyes, but the finest honor is the respect that the boys will give you," he added.

Joe came to Livermore in 1968, completing a cross-country migration with Little League that first started in Schenectady, N.Y., in 1951. "The year Willie Mays started pro baseball with the Giants and at the time the Giants won the pennant under Leo Durocher," recalls Joe. "I was in Schenectady waiting for clearance for a job with General Electric. One day I stopped at a ball field where the kids were playing and just got interested. From then on it became natural, no matter where I was, I was working with kids."

If there were no Little Leagues around, Joe worked in church leagues, and he was one of the forces that got the Little League program started in Albuquerque after he

arrived there in 1959. The program grew from one league with 150 participants to 13 leagues involving 4000 boys by the time he transferred to Sandia Laboratories Livermore in 1968.

"Almost immediately, it seemed, someone heard that I had worked previously with Little League, so I was back into it with only a two-week absence," says Joe.

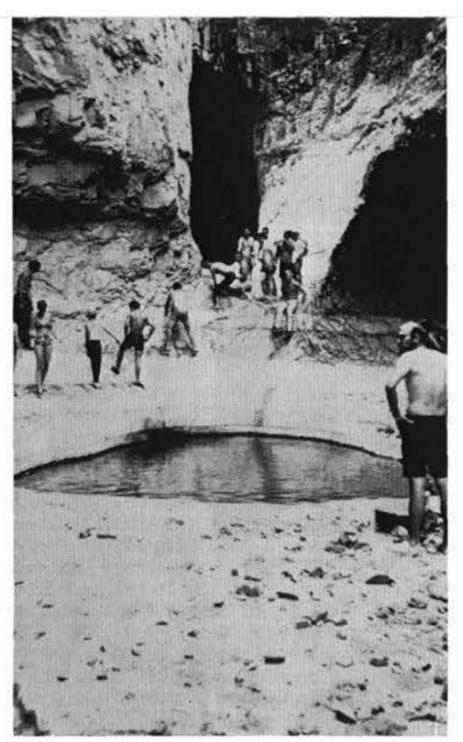
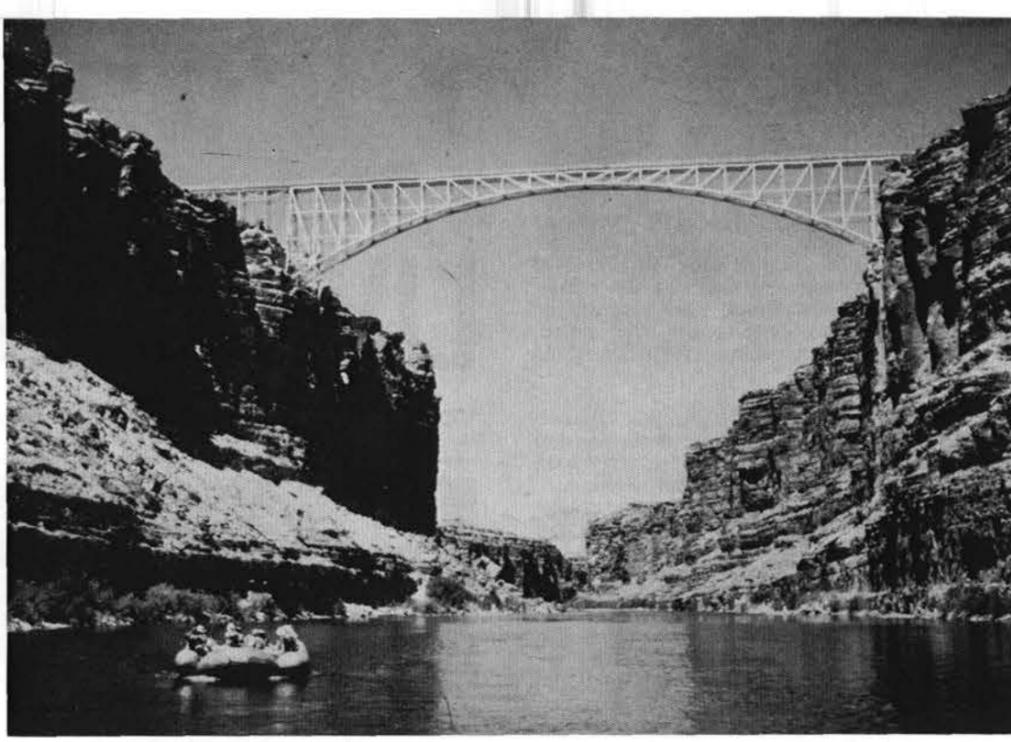
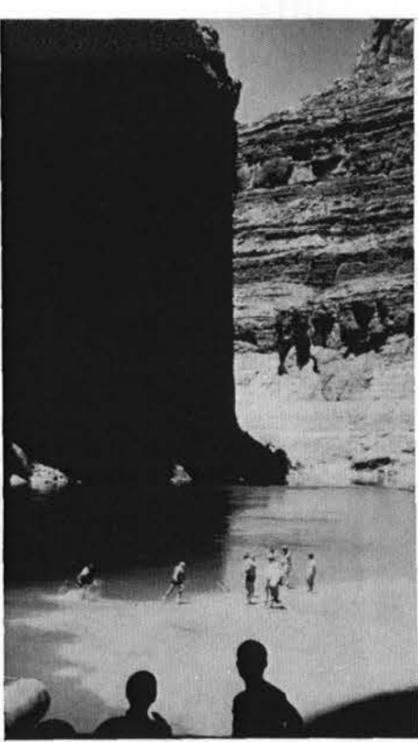
"Perhaps the main reason I've spent so much time with the program is the satisfaction I get out of watching the kids who have the desire to play baseball grow, and after a number of years of training become good ball players," comments Joe.

"Over the years I've learned much about Little League workings and what it does for the participants. One of the biggest things Little Leaguers get is a sense of responsibility. Many go on to coaching and umpiring, taking the responsibility in the same manner they did when they were players on the team."

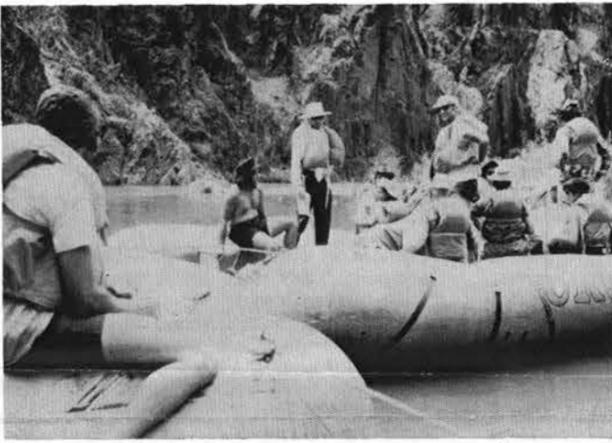
Joe says he has strong feelings about parents and their role with their boy. "Parents shouldn't just send their boy out to play," he claims. "The magic word is desire. Under no circumstances should he be forced to go out for a sport because it's the vogue. If he expresses a desire to play, then the parent should spur him on. Emotional parents who shout at their boy should stay away. We have a rule that we emphasize — if you can't say something good, don't say anything."



JOE BRADSHAW (8125) who was recently presented with a trophy (inset) for his 20 years of service in Little League, describes a call to several other Sandians involved in Little League, (from left) George Perkins (8213), Nick Wittmayer (8231), and Paul Coronado (8331). Joe currently coordinates the umpire activities for one of Livermore's Little Leagues.



Inland Sailors Bash Colorado and Vice Versa



What could be cooler than 10 days on the rapids of the Colorado River down through the Grand Canyon? Two boat-loads of Sandians and their wives gave it a try last month. There was a charter bus from Albuquerque to Lee's Ferry in Utah where the boats were launched. Three days later, some called it quits at Phantom Ranch (south rim, near Flagstaff, Ariz.) and hiked 11 miles out of the canyon, but others joined the trip there and continued seven days to Temple Bar, where the Colorado empties into Lake Mead. Mark Percival (5315) and Gerald Barr (9114) organized the tour with commercial outfitters supplying the boats, food, etc. Not much chance to get "boat bound," as stops were made at Redwall Cavern, Vasey's Paradise, Silver Grotto—and any time the group felt like a swim.



Service Awards

20 Years



Doug Ballard
7361



Roy Brett
3520



Ralph Campbell
3428



Arthur Cary
7373



Wallace Eder
7611



Charles Farmer
3520



David Gomez
4612



Victor John
4221



Noel Kent
3521



Larry Lesperance
4513



Edward Marsh
9225



Billy Neil
4612



Marion Scott
4623



Wilburn Walker
3520

15 Years



Edna Baca
3422



Chandra Carson
3452



Joaquin DeVargas
9414



Jake Gonzales
4253



Alice Hodyke
4310



Margaret Mancuso
3411



J. E. Postlethwaite
1555



Joseph Suknot
7651



Malcolm Woodward
7524

10 Years

William Edwards 4221, William Lynch 2323, Donald Greene 4251, Kent Bowen 5161, Jim Harter 8251, Phyllis Swartz 3431, Dean Kuehl 7325, Joe Buchler 8256, Miriam Hall 8263, Aurora Baca 3255, and Neta Tyler 9512.

Congratulations

Mr. and Mrs. Billie Palmer (4222-4), a son, Timothy Lee, July 7.

Mr. and Mrs. Ray Lucero (4613), a son, Michael James, July 25.

Authors

C. S. Williams (2625), J. A. Cooper (2627), and J. R. Huynen (Lockheed), "Antenna-Polarization and Terrain-Depolarization Effects on Pulse-Radar Return from Extended Areas at the Near Vertical," September issue, PROCEEDINGS OF THE IEEE.

W. A. Millard (9324) and W. H. Curry (9322), "A Thin Strap Support for the Measurement of the Dynamic Stability Characteristics of High-Fineness-Ratio, Wind-Tunnel Models," July issue, JOURNAL OF SPACECRAFT.

12 Consecutive Strikes

Ken Jones Bowls Perfect Game

A perfect game in bowling scores 300 and it requires 12 strikes in a row.

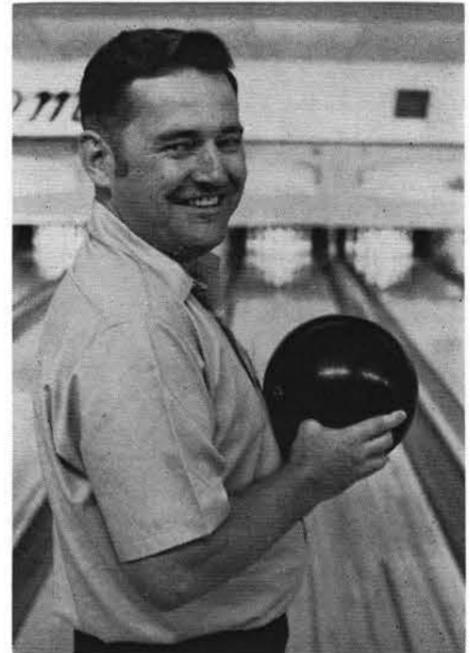
Ken Jones (7615) bowled a perfect game on Aug. 10 at the Holiday Bowl while participating in league play. It was the first sanctioned 300 game bowled in Albuquerque since April 1969.

Naturally, Ken felt pretty good about it. He's been trying for the magic 300 since he started bowling 12 years ago.

"I've come close a number of times," he says, "but I always went to pieces after about the eighth or ninth strike. This time I just stayed numb. I don't remember much about it except the relief when it was over. I finally made it."

Ken averages 197 in league play which makes him one of the better Sandia bowlers. He has a case of trophies after finishing in the top teams in league play for years.

For the 300 game, Ken received various awards and prizes, including a plaque and certificate from the American Bowling Congress.



KEN JONES
—bowls perfect game—

Norman Sinnott Addresses NATO Panel in Belgium

Norman Sinnott (7222) will be in Brussels, Belgium, next week to address the Guidance and Control Panel of NATO's Advisory Group for Aerospace Research and Development.

He will discuss the history and accomplishments of the IEEE Gyro and Accelerometer Standards Panel during a business meeting Monday preceding start of the panel's 11th annual symposium.

Norman is chairman of the IEEE standards panel.

Speakers

S. W. Key (1541), "The Analysis of Thin Shells with a Doubly Curved Arbitrary Quadrilateral Finite Element"; R. D. Kreig (1541) and H. C. Monteith (9422), "A Large Deflection Transient Analysis of Arbitrary Shells Using Finite Differences," Conference on Computer Oriented Analysis of Shell Structures, Aug. 10-14, Sunnyvale, Calif.

G. A. Samara (5132), "The Dielectric Properties of Ionic Crystals: The Effects of Temperature and Pressure," 1970 NATO Advanced Study Institute, Aug. 2-14, Delft, The Netherlands.

H. R. Spahr and D. W. Larson (both 9513), "The Multiple Revolution Reentry Problem," 1970 AIAA Guidance, Control and Flight Mechanics Conference, Aug. 17-19, Santa Barbara, Calif.

D. Emin (5134), "Small Polaron Theory," Gordon Research Conference on Transition Metal Compounds, Aug. 10-14, Meriden, N.H.

C. N. Vittitoe (5231), "Electromagnetic Pulse Generation from a High Altitude Gamma Ray Source," Symposium on Upper Atmospheric and Electric Fields, Aug. 17-21, Boulder, Colo.

H. H. Wicke and J. M. Worrell (both 1721), "On Open Bicompart Images of Paracompact M-Spaces" and "Perfect Mappings and Certain Interior Images of M-Spaces," American Mathematical Society Meeting, Aug. 25-28, Laramie, Wyo.

Supervisory Appointment



RAY REYNOLDS to supervisor, Preliminary Systems Design Division 1531, effective Aug. 16.

Ray joined Sandia in August 1961 as a staff member in a weapon systems development group. Since that time, Ray's work has been with systems engineering and development. From February 1969 until March of this year, he was on temporary assignment in Washington, D.C., with the Defense Communications Planning Group. Until his promotion he had been with Exploratory Systems Division.

Before coming to Sandia, Ray was a student at Texas Technological University in Lubbock. He earned BS and MS degrees, both in electrical engineering.

Ray, his wife Betty and their two children live at 3121 Britt NE.

Death



Berenice Henry, a transcription service clerk in Technical Information Division II, 3412, died Aug. 21 after a long illness. She was 56.

She had worked at Sandia Laboratories since April 1952.

Survivors include a sister.

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

'69 HONDA 90S, \$225. Piraino, 205 Adams NE, Apt. 3.
OLD FASHIONED rocking chair, \$18; table lamp, \$3.50. Campbell, 268-8445.
PEEK-A-POO pups, 6 wks, black & white male & 2 mostly black females. Dow, 296-4344.
MINIATURE SCHNAUZER puppies, paper trained, 6 wks. old, w/papers, AKC reg., 1 male, 1 female. Putz, 298-2221.
DOUBLE SINK w/disposal, \$20; steel sash window, \$8; GE stove, \$25; old cupboards, \$2 ea. Stromberg, 255-6131.
KENMORE gas stove, \$30. Harper, 298-0146.
YOUTH BED w/mattress, \$12; sidewalk bicycle, \$10; small tricycle, \$3. Peterson, 256-7514.

WESTINGHOUSE washer & dryer, needs slight repairs, \$35 for pair; GE 14" B&W portable TV, needs repair, & stand, \$15; Remington pump-action, .244 w/scope & case, \$75. Jacklin, 298-3046 after 5:30.
FIBERGLASS fold-down-type camper, deluxe interior, sleeps 6. Kochmann, 299-5133.
DINING ROOM table & 6 chairs, hutch, pecan, \$175. Adent, 299-1905.
11'x17' BRAIDED OVAL RUG, \$35. Nelson, 255-2364.
5 ALBUM Judy Garland records, new, \$15. Eaves, 299-7728.
B-FLAT CLARINET, used 2 yrs., \$75. Moore, 268-9658.
BABY BATHINETTE, \$5; portable play pen/crib w/pad, \$10. Long, 296-5248.
'68 ARISTOCRAT Lo-Liner 15' trailer, 75-lb. ice box, 110-12v system. DeVargas, 299-0477.
LUDWIG 5-piece drum set, accessories included, red pearl, \$295. Smythe, 298-9080.
ANTIQUES: French Limoges Haviland cups & saucers, \$3 ea.; 4 iridescent stem goblets, \$4 ea.; toothpick holder, \$5. Smitha, 299-1096.
SONY stereo tape recorder, P C 500 A, 20-watt power output, \$180. Monson, 298-7969.
CHEST, solid maple, 3-drawer, \$40; 2 matching occasional tables, \$10 ea. Johnson, 298-0296.
MINIATURE SCHNAUZERS, 6 wks., championship blood lines, 2 males, 2 females. Millsap, 296-5198.
HOOVER Dial-A-Matic vacuum cleaner plus attachments, \$30. Miller, 255-6838.
POODLES, Toy, males, female; used electronic parts. Johnson, 298-7566.

HQ 180 Hammerlund all band communications receiver, matching speaker, 100KC calibrator & clock, \$200 firm. Small, 299-0023.
MOTORCYCLE, '69 Kawasaki, 175cc F-3 Bushwacker w/dual sprockets, electric start, \$395. Graeber, 298-0662.
TWIN SIZE pecan wood bed & flat coil spring. Kowalski, 299-0585.
SELMER TRUMPET w/radial valves, \$325. Schmierer, 299-2352.
GIRL'S clothing sizes 8 & 10; boy's sizes 12 & 14; Boy Scout bugle; child's life jackets. Scheiber, 299-4743.
POOL TABLE; mosaic dinette table; golf carts, bags; basketball backboard; sewing machine; carpet sweeper; EICO VTVM; doll crib. Swiss, 265-5346.
2 CARBETS; 2 VW rims; stroller; steel utility shelves; table; loudspeaker w/cabinet; boy's 20" bicycle. Bushnell, 298-9631.
GOLF CLUBS, Men's right hand, 9 irons. Spray, 299-0412.
REM. 700 ADL 30-06 w/4x32 scope & mounts, \$115. Svensson, 344-7700.
1970 EDITION of Britannica Jr. w/book rack, never used; 20" boy's bicycle; book head board for dbl. bed. Peterson, 299-4714.
PUSH MOWER, \$8; size 10 Mouton coat, \$8; long blue crepe formal, \$8; women's shoes, size 7, \$2. Kyzar, 296-4308.
GE floor polisher & acc., \$12.50; 50-cup Mirromatic percolator, \$5. Ferguson, 299-1501 after 5:30.
REM. Model 1100 12-gauge auto. shotgun, 28" ventilated rib, modified choke, \$145; consider trade on over and under. Shock, 877-3728.
'66 SUZUKI, twin 150cc, \$250. Kelsey, 842-8263.

SOFA, 86" Colonial, \$35. Colgan, 344-3776.
KENMORE WASHER, \$10; 2 pr. of drapes, dbl. and triple width, \$3/pr.; 3 traverse rods. Melvin, 298-6402.
KITTENS, 7 wks. old, 2 long-hair, 2 short-hair, free to good home. Scott, 242-7339.
REGULAR 8mm Kodak movie camera, \$10; Argus self-threading 8mm projector, \$50. Rex, 255-2871.

CARS & TRUCKS

'68 DODGE custom sportsman, 318 V8, AT, AC, seats 8, \$2495. Lusk, 296-5145.
'69 CAMARO, orange w/white vinyl top, 350 V8, 3-spd. AT, chrome wheels. Edwards, 296-7164.
'65 INT. pickup, 1/2-ton, LWB, 4-spd., 4 new tires, \$1300. Cherino, 865-9588.
'65 PLYMOUTH Sports Fury, V8, 4-spd., bucket seats, R&H, PS, one owner, \$1000. Hopper, 299-5515.
'62 VW w/rebuilt engine & new sunroof, \$625. Powell, 299-8877.
'61 BUICK, PS, PB, air, radio, runs OK, needs some body work, \$200. Henning, 299-0318.
'64 CADILLAC, white, 4-dr., all power, complete new engine overhaul, needs paint, \$1500, no less. Gallegos, 268-0271.
'68 DODGE Custom Sportsman van, 3180, AT, AC, seats 8, \$2495. Lusk, 9012 Haines NE. 296-5145.
'67 IH TRAVELALL, 1100 custom model, plenty of power & extras, V8, AT, PS, PB, extra gas tank, etc. Rowley, 299-8419.
'69 VW Fastback, AT, 30,000 miles, take over payments, see at 530 Utah SE, Space 24, Rodriguez, 264-6730 4 p.m.-12.
'64 OLDS 88, AT, PB, PS. Farness, 299-2132.

'64 GALAXIE 2-dr. HT, PS, air, 352 cu. in. V8, low mileage. Barnett, 298-4382.
'65 GMC LNB, 230 CID eng., 4-spd., \$1025; '67 GMC, LWB, 292 CID eng., 4-spd., \$1525. Bauder, 299-7322.
'53 WILLYS JEEP, 4-wd pickup, 4-cyl., Warn hubs, \$495. Nogales, 247-1178 after 6.

REAL ESTATE

1/2 ACRE w/Ponderosa pines, North 10 area, new 130'well w/3/4hp submersible pump, underground well box & 80-gal. pressure tank. Goens, 282-3492.
10 ACRE RANCH, plenty water, corrals, stables, 24x36 bldg., lights, phone, landscaped; '68 mobile home w/or without acreage. Baxter, 264-4657 or Moriarty - 832-4371.
3-BDR., 1 1/2 bath Hoffman Royal, buy equity & assume present 6% loan. Dolce, 296-4033.
LOS LUNAS, newly carpeted 3-bdr., 2 bath, den, fp, dbl. garage, 1/2-acre, \$600 down, balance \$13,000. Skelley, Rt. 1, Box 1177, Los Lunas.

WANTED

FIRM DOUBLE BED box springs & mattress. Peterson, 256-7514.
TRICYCLE. Colgan, 344-3776.

LOST AND FOUND

LOST—Rx glasses w/dark frames, yellow earrings. Rx sunglasses, gold earring. LOST AND FOUND, tel. 264-2757, Bldg. 832.
FOUND—Brown coin purse from "Harrah's", silver heart on chain necklace, gold earring w/pearl stone, ballpoint pen, multipoint mechanical pencil. LOST AND FOUND, tel. 264-2757, Bldg. 832.



Events Calendar

Aug. 28-30—"The Milk Train Doesn't Stop Here Anymore," Corrales Adobe Theater.
 Aug. 28—Spanish fiesta at Isleta Pueblo.
 Aug. 28-30—Albuquerque Civic Light Opera presents "Oliver," UNM Popejoy Hall. Sunday matinee.
 Sept. 2—Acoma fiesta.
 Sept. 5-7—Santa Fe fiesta.

Promotions

Linda Jo Backman (8183) to Secretarial Typist
 John Barnhouse (8322) to Computer Operator
 Elaine Bell (3255) to Typist
 Lewis Blackman (4222) to Technician
 John Boyes (4361) to Procurement Specialist
 Richard Chavez (4623) to Record Clerk
 Diana Davy (8163) to Secretarial Typist
 Fidel Gabaldon (9415) to Messenger
 Tony Gabaldon (4544) to Office Machine Repairman
 Martin Gonzales (4222) to Technician
 Reynaldo Gonzales (4518) to Helper
 C. Gutierrez (4518) to Helper
 Dorothy Holloman (3411) to Editorial Assistant
 Pauline Lamberson (1612) to Editorial Assistant
 Elizabeth Larrick (3452) to Reproduction Equip. Operator
 Cosma Lovato (4518) to Helper
 Marie Luna (3421) to Library Assistant
 Gabriel Maestas (4518) to Helper
 Dorothy Mann (3421) to Librarian
 Charlotte Marks (4623) to Record Clerk
 Margaret Marquez (3255) to Typist Clerk
 Jose Salazar (4222) to Technician
 Melquiades Salazar (9411) to Computer Facilities Clerk
 Manuel Sanchez (4518) to Helper
 Kathleen Sandoval (3256) to Steno Clerk
 Jose Sena (4222) to Technician
 Donadieu Sonnier (4518) to Leadman
 Rebecca Statler (3256) to Steno Clerk
 Sylvester Tafoya (4518) to Helper
 R. R. Teasdale (3412) to Editorial Assistant
 Prospero Toledo (4518) to Helper
 Florencia Valtierra (3256) to Secretarial Steno
 Bonnie Vigil (3256) to Steno Clerk
 Wilbur Walters (9411) to Computer Facilities Operator
 Betty Lou Womack (3122) to Administrative Clerk
 Jose Rivera (4364) to Laboratory Staff Associate
 Linda Flatt (4333) to Record Clerk
 Rosie Jennings (4333) to Teletype Operator

LAB NEWS

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**DRIVE SAFELY
 MY FRIEND**



**IT'S SCHOOL
 TIME AGAIN**

New Price Announced For Bahamas Tour; Group Meets Sept. 8

A new price of \$299 has been negotiated for the Coronado Club's six-day package tour to Grand Bahamas Island Dec. 9-15, according to Chet Fornero (4337), Club travel director. The new price (formerly announced as \$315) is contingent on filling the 140 minimum. The tour still includes first class jet flight, welcoming cocktail party, six nights at the luxurious Kings Inn Hotel, unlimited swimming and golf, and breakfast and dinner each day. The Kings Inn has excellent facilities including two 18-hole championship golf courses, multiple swimming pools and a casino.

Only 25 seats remain to be filled for the tour, Chet says, and the deadline is rapidly approaching. Final payment is due Oct. 15 but anyone seriously considering making the trip should make the \$25 deposit right away.

The Bahamas tour group will meet at 7:30 p.m. Tuesday, Sept. 8, in the Club's ballroom for a question and answer session. Movies will be shown and representatives of the travel agency will be on hand.

Coronado Club Activities

Vaudeville Night Scheduled Sept. 5; Swim Party Will End Season

Something different is planned for September's big party at the Coronado Club. Called a "Family Vaudeville Night" and scheduled Saturday, Sept. 5, the evening will feature a variety show with performers from the Albuquerque Melodrama Theater, a songfest with the 12-voice Fiesta Singers, and a movie, "When Comedy Was King."

The movie is a compilation of comedy highlights from the silent film era featuring Charlie Chaplin, Buster Keaton, Wallace Beery, Gloria Swanson, the Keystone Cops and many, many others.

The evening will start at 6:30 p.m. with steak sandwiches available at \$1.15. Happy hour prices will be in effect all evening and soft drinks will sell for a nickel. The entertainment will start at 7 p.m. It should be great fun for the whole family. Admission is free to members, 50 cents for guests.

End-of-Season Swim Party

Labor Day is traditionally the last day of swimming at the Coronado Club twin pools. The end of the season, Sept. 7, will be marked this year with a patio party. Beer will sell for 10 cents from 11 a.m. until 6 p.m. and a happy hour bar will be in operation. The Mariachi Gala will

Mini-Maxi Fashion Show Set for Sanado Sept. 8

Sanado Woman's Club will bridge the fashion gap from mini to maxi on Tuesday, Sept. 8, at a sherry-luncheon at 1:15 at the Coronado Club.

The meeting will feature the latest in fall fashions, including how, when, and where to wear the new fashion lengths. Models for the show will be members of the club with Mrs. R. S. Lemm as the coordinator-commentator.

Reservations should be made no later than Friday, Sept. 4, with Mrs. V. G. Nelson, 801 Van Buren Place SE.

entertain from 12:30 until 3:30 p.m. Both pools will be open for recreational swimming.

Social Hours

Tonight Gappy Maestas will make the happy music while the Club's famous seafood is spread for the buffet. The buffet costs \$1.25 for adults, \$1 for kids.

Happy 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 TGIF crowd moves to the main lounge where Yolanda Adent and piano entertain with a sing-along until midnight.

On Friday, Sept. 4, Mexican food will be the buffet feature while Frank Clark and the Good Times will hold the bandstand.

Phil Graham's orchestra is booked for Friday, Sept. 11, and the Club's special Italian food buffet is planned.

In the meantime, midweek social hours continue on Tuesday evenings from 5 to 8 p.m.

Dance Lessons

Starting Sept. 14, the Coronado Club will offer both beginning and advanced dance instruction on Monday evenings. Scheduled for 10 weeks, the beginning group will meet at 7 p.m., the advanced at 8:30. Gall and Jennifer Ward are instructors. Cost is \$20 per couple which may be paid at the Club office any time before the first session starts.

Junior Bowlers Organizing

The Coronado Club junior bantam bowling league will hold an organizational meeting and party on the Club patio tomorrow at 12:30 p.m. Any Coronado Club youngster age 16 or younger interested in league bowling should contact Cis Kelly (3113), tel. 299-3700, for additional information. The teams bowl on Saturday mornings.

Club Announces Bus Tour to El Paso for Lobo-Miner Game

A three-day bus trip to El Paso Oct. 30-Nov. 1 is planned by the Coronado Club for Lobo fans who want to watch the Lobo-Miner football game and visit Sunland Park and Juarez. The tour will cost \$42.50 per person and will include transportation (including local transportation in El Paso and Juarez), two nights at the downtown Holiday Inn, ticket to the football game and ticket to Sunland Park and the Juarez dog track.

"It's going to be a great weekend and a good group," Chet Fornero (4337), Club travel director, says. "We're planning on serving refreshments on the bus to and from El Paso."

Chet has reserved 90 seats at the football

game between the 40 yard lines and booked 50 rooms at the Holiday Inn. The charter buses will leave from the Coronado Club at 12:45 p.m. Friday. Friday night the tour group will visit the dog track in Juarez, Sunland Park on Saturday afternoon (or an optional trip to Juarez for shopping), and the game is scheduled Saturday night. The buses will start the return trip to Albuquerque about noon on Sunday.

Reservations are on a first come, first served basis, Chet says. A \$10 deposit should be made at the Club office right away with final payment due Oct. 1. Non-member guests are eligible for this trip. For single room occupancy, a \$12 differential fee is added to the cost.



TWO CHAMPIONSHIP golf courses are part of the facilities of the Kings Inn on Grand Bahamas Island. Twenty-five spaces remain for the Coronado Club travel package there Dec. 9-15.