

MISSILE

# RANGER

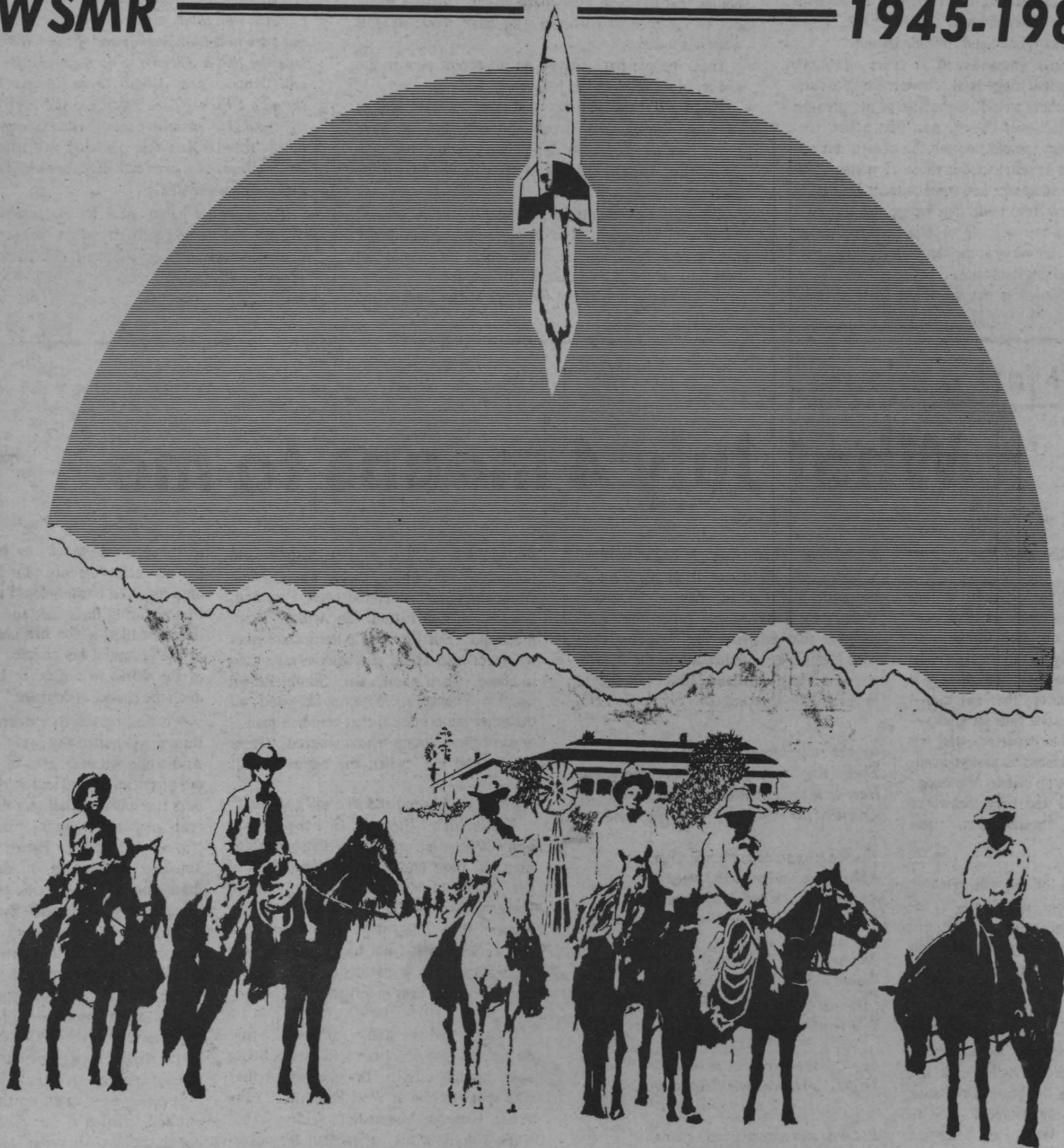
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FRIDAY, JULY 4, 1980

WSMR

1945-1980



See page 21 and centerfold for map, schedule and details

# Commentary !!

Opinions expressed on the editorial page are those of various writers and do not necessarily reflect the opinion of the Department of the Army or White Sands Missile Range. All letters to the editor (except those defaming identifiable individuals or containing obscenities) will be published. Names are withheld from printing upon request; however all letters must be signed. The newspaper staff reserves the right to edit submissions for clarity and brevity.

## A very special message to the people of WSMR

Today we are celebrating two important occasions—that of American independence and the birth of this vast area known as White Sands Missile Range.

Who would have guessed that 35 years ago 4,000 square miles of silent range land conquered by the early settlers and ranchers would be the site of the greatest discovery man has ever known. And that a new conquerer, technology, would become the present tenant.

A lot has been accomplished in those 35 years. There have been many successes and some failures. But much has been learned from both. The range has played a valuable part in the defense of this nation through testing and research while at the same time helping man reach heaven and the stars above.

Today's celebration is not for those feats of tech-

nology that have left their mark on the Tularosa Basin but to the men and women who have made WSMR what it is today.

These people have played an important part in the history of America and its freedom.

There are those who say that America has little to celebrate during these troubled times. But we have never had an easy time defending freedom not only for us but for the world. History has proved that to be true.

But with this country's greatest resource, that of its people, the goals of knowledge and global peace can be accomplished. The future holds the promise of better times for all and that is why we are here today.

John Adams, one of the founders of the Declaration

of Independence, put it this way when he said:

*"You will think me transported with enthusiasm, but I am not. I am well aware of the toil and blood and treasure that it will cost us to maintain this Declaration and support and defend these United States. Yet, through all the gloom, I can see the rays of ravishing light and glory. I can see that the end is more than worth all the means. And that posterity will triumph in that day's transaction, even although we should rue it, which I trust God we shall not."*

Therefore we salute America and more importantly WSMR and its people. Congratulations for 35 years of achievements and best wishes for 35 more. This issue is dedicated to you.

D.J. Montoya  
EDITOR

### Now wait just a minute

## What July 4 means to me

BY THE OLE TIMER

WSMR is preparing for a gala 4th of July celebration to commemorate its 35th year as a military installation. It is fitting to do this, for the 4th of July is truly an American holiday. And what an ideal time to have a holiday—the middle of the summer—school is out—it is vacation time for adults—good weather can be expected—and an ample supply of politicians is always available. The 4th conjures up visions of parades and picnics, baseball and beer, fireworks and fun, hot dogs, watermelon, and speeches.

The central theme of the 4th remains independence, freedom and liberty. Independence, freedom, and liberty are second nature to us. They have become implicit with being an American. But in our island security, we have often forgotten that independence, freedom and liberty have been and continue to be hunted and stalked around the world. If as Thomas Jefferson said, "Eternal Vigilance is the price of liberty," then the price of vigilance is the lives of men and women. For as Jefferson also said, "We are not to expect to be translated from despotism to liberty in a feather bed."

It is easy to find oration from our patriots past espousing the 4th of July theme.

But, for some reason, none of these were able to portray to me the spirit I was searching for. So I put down my research

a few days. Then I vaguely began to recall a poem—an old friend from my English literature high school days: "Concord Hymn" by Ralph Waldo Emerson. I remember that Emerson had written "Concord Hymn" as a dedication to the Massachusetts Minutemen and Militia who fought in Lexington-Concord on 19 April 1775.

*By the rude bridge that arched the flood,  
Their flag to April's breeze unfurled,  
Here once the embattled farmers stood  
And fired the shot heard round the world.*

*The foe long since in silence slept;  
Alike the conquerer silent sleeps;  
And time the ruined bridge has swept  
Down the dark stream which seaward creeps*

*On this green bank, by this soft stream,  
We set today a votive stone;  
That memory may their deed redeem  
When, like our sires, our sons are gone.*

*Spirit, that made those heroes dare  
To die, and leave their children free,*

*Bid time and nature gently spare  
The shaft we raise to them and thee.*

The phrase that caught my mind was: "Spirit, that made those heroes dare to die." Americans like and make their heroes—particularly their military heroes big. With each of our wars we easily associate a name or names that have been

permanently etched in our history and memory—Washington, John Paul Jones, Grant and Lee, Custer, Roosevelt, Pershing, Eisenhower and Patton, MacArthur, Westmoreland. But Emerson's heroes are men we never hear about and seldom take time to honor. Their names are: Smith, Brown Gomez, Flanagan, Wilson, Ski—and all the other multitudes of that common man—most of them young who answered, "Here am I, send me" when the nation called,

"Whom shall I send and who will go for us."

The Smith's, Brown's, Gomez's, Flanagan's, Wilson's, and Ski's—those common men put flesh and blood into the plans of the Washington's, Grant's, and Eisenhower's. We don't want to make them bigger than life—they were human—but we also should not forget courage and dedication that was so common—place that it becomes easy to forget.

I wish I had the ability to describe and do justice to the American soldier. Not being able, I must turn to Douglas MacArthur who spoke of him at West Point on 12 May 1962. General MacArthur said: "...but when I think of his patience under adversity, of his courage under fire, and his modesty in victory, I am filled with an emotion of admiration that I cannot put into words. He belongs to history as furnishing one of the greatest examples of successful patriotism; he belongs to posterity as the instructor of future generations in the principles of liberty and freedom; he belongs

to the present, to us, by his virtues and by his achievements. In 20 campaigns, on a hundred battlefields, I have witnessed that enduring fortitude, and that invincible determination which has carved his statue in the hearts of his people. From one end of the world to the other he has drained deep the chalice of courage."

We find ourselves concerned with those things we personally want to experience. And while we may give of ourselves with our physical, mental and spiritual resources, ours is really a selfish sacrifice, because we reap personal benefits from our efforts. Not so with theirs. Theirs was complete, absolute, irrevocable. In death, many of them fought harder and had a greater passion for life than in life itself.

Our heroes who dared to die would answer a roll call from every corner and cross road of every state.

Individually, they were a personal loss to family and friends—a Mother's present to the future; a Father's dream of the future. To the nation, they represent independence, freedom and liberty—the price of vigilance.

Several years ago I watched a TV show entitled "Brian's Song"—a true story about the love between Gail Sayers and Brian Piccolo. Brian Piccolo was dying of cancer at the age of 26 and Gail Sayers upon being awarded a trophy as the outstanding professional football player for the year refers in his acceptance speech to his love for Brian and of Brian's courage. I would like to borrow from that speech and close with this: "I love the Americans soldier and I want you to love him too."



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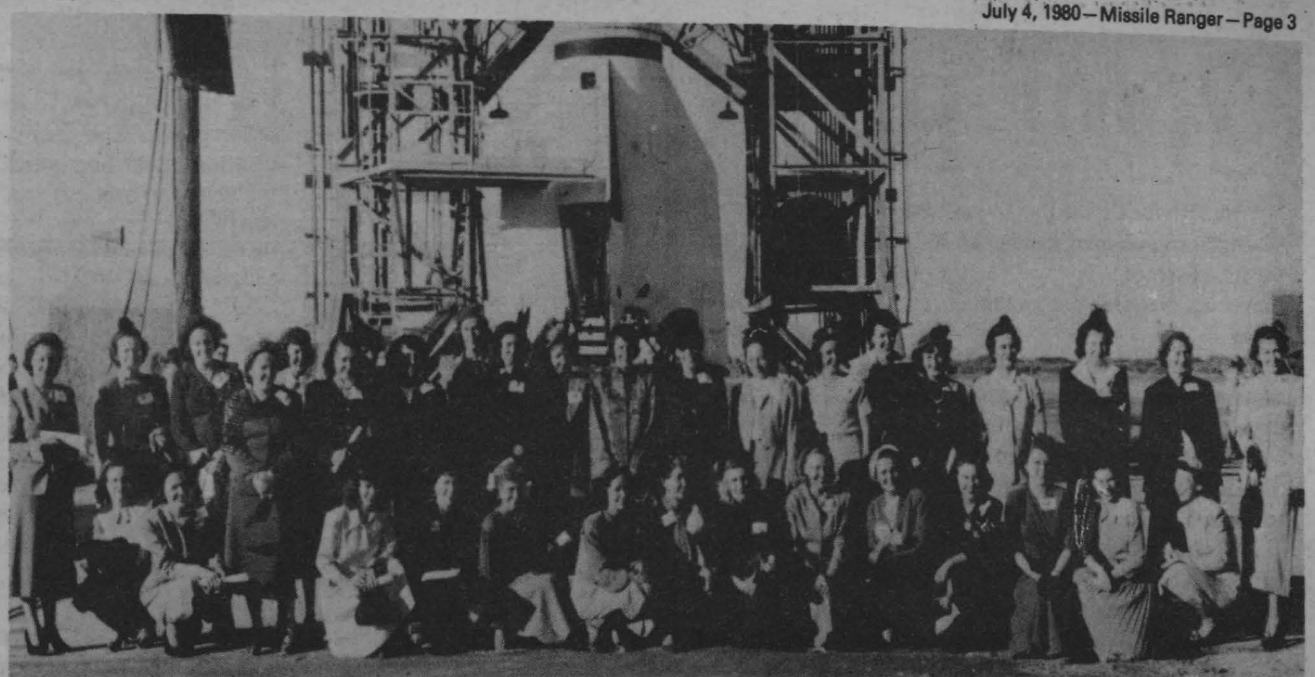
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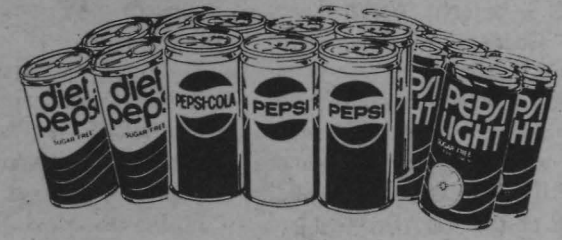


**PARTING SHOT**—It wasn't unusual when they gathered for a shot in front of the gantry housing a V-2 back in the early 50's? to find the Officers' Wives Club meeting in odd places around post. Remember

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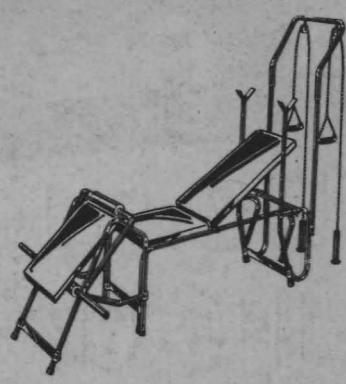
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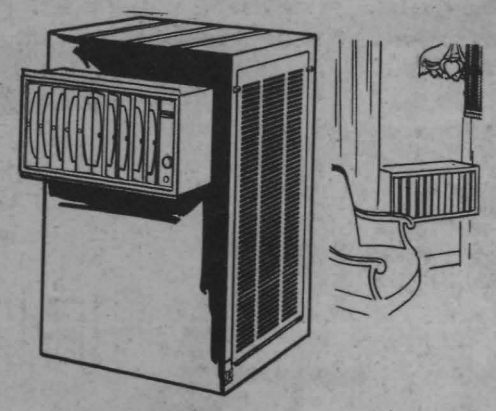
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# WSMR owes debt to Robert Goddard

White Sands Missile Range owes a debt of gratitude to one man more than any other for its existence. For without the work of that man we probably wouldn't be here today.

That man, Dr. Robert H. Goddard, made most of the significant advances in the development of rocketry before the American people or the U.S. government, for that matter, even considered rocketry and the resultant space exploration seriously.

Rocketry really began in China in the 11th century, but early rockets were widely known in many parts of Europe, and several types of rockets were mentioned in a German military report dated in 1405.

In 1855 the first two-stage rocket was devised and used to project life-lines in sea rescue. Little was accomplished during the ensuing years until Dr. Goddard began his studies in the late 1800's.

Known as the father of modern rocketry, Dr. Goddard was born in Worcester, Mass., Oct. 5, 1882. At the age of 17, he had a dream of man's flying to the moon and to Mars.

Despite being sickly he finished high school, obtained a bachelors and masters degree and pursued the science of space. He wrote numerous papers but for the most part was laughed at. After all, here was a man talking about rockets before even most scientists believed man could travel by airplane.

But Dr. Goddard was determined. He began his experiments with rockets in the basement of the Worcester Polytechnic

Institute in 1908. He became an instructor of physics there while continuing graduate study at Clark University, where he received his MA degree. In 1911 he completed his PhD, also at Clark. During the next two years the doctor served as a research fellow at Princeton University.

Dr. Goddard's thinking was far too advanced for his time, and scientific periodicals to which he submitted his manuscript promptly returned it.

For instance, in 1907 a paper prepared by him discussed the means of furnishing jet propulsion sufficient to permit navigation in interplanetary space. Two years later he conceived the idea of using hydrogen and oxygen as fuels for interplanetary rockets.

In 1914 he intensified his research into solid as well as liquid-fuel rockets. Using his own funds he constructed rockets of various types to use in his experiments.

When his resources were depleted in 1916, he submitted papers on his work to several foundations, seeking financial backing for his research activities. The Smithsonian Institute supplied an \$11,000 grant, the investment which launched modern rocketry.

When the U.S. entered World War I in 1917, Dr. Goddard volunteered his services and was assigned the task of investigating the military possibilities of rockets. He successfully developed several types, one of which was the forerunner of World War II's successful "Bazooka."

At the close of the war, Dr. Goddard returned to his work on the development of

At the close of the war, Dr. Goddard returned to his work on the development of high-altitude rockets, and on March 16, 1926 the world's first liquid propelled rocket took flight at Auburn, Mass. This was the true precursor of the German V-missiles of the second World War and the granddad of the space age.

It wasn't easy to experiment with noisy rockets in the densely populated Massachusetts. In 1929 Goddard's fourth liquid-propelled rocket brought problems.

The rocket flew 184 feet in 2.5 seconds. The roar of the fiery rocket startled citizens who thought a plane had crashed. The wire services picked up the story of the rocket, saying Goddard's rocket to the moon had exploded some 230,000 miles short of its target. The Massachusetts fire marshal forbade Goddard to fire his rockets within the borders of the state again.

Completely overlooked in the uproar was the fact that the rocket had carried an instrument package containing an aneroid barometer, thermometer and a camera triggered to operate when the parachute opened. All were recovered completely intact.

Through the assistance of Dr. Charles Abbott, secretary of the Smithsonian Institution, the War Department granted Goddard permission to use part of the artillery range at Camp Devens, now Ft. Devens, Mass. However, he could only test after rains or when snow was on the



**Dr. Robert Goddard**

high-altitude rockets, and on March 16, 1926 the world's first liquid-propelled rocket took flight at Auburn, Mass. This rocket was the true precursor of the German V-missiles of the granddad of the space age.

Goddard's achievement predated the use of liquid fuel in the German V-2 by nearly 18 ground.

As a result of his 1929 flight, Dr. Goddard's work attracted the attention of Colonel Charles A. Lindbergh, first person to fly the Atlantic solo. He in turn called it to the attention of Harry Guggenheim and his father, Daniel Guggenheim.

The Guggenheim Foundation granted Goddard \$25,000 per year for at least four years. For the first time he had adequate financing, and he moved his work to Roswell, N.M. for comparative freedom for testing on the New Mexico desert.

At Roswell he established himself at Mescalero Ranch, just 100 miles from the site to be chosen later for the establishment of the White Sands Proving Ground, now White Sands Missile Range.

There, at Mescalero Ranch, he fired the first gyro-stabilized missile in 1932. On July 28, 1937 he launched the first rocket to use a pivoted motor for steering.

In 1941, Dr. Goddard accepted an invitation to join the Naval Experimental Station at Annapolis, Md., and continued his research there.

He had planned to return to Roswell at the conclusion of World War II, but he died unexpectedly Aug. 10, 1945. He had lived long enough, however, to see the U.S. recognize the importance of his gigantic contribution to that science.

There are 214 patents granted or under consideration in his name. He was not only the first to develop liquid fuel rockets, but was also first to fire one which attained a speed faster than the speed of sound.

He was first to steer a rocket by the use of vanes in the blast of the rocket motor. He patented the idea of step rockets, made the first application of instruments to record conditions of the rocket during flight, and developed the mathematical theory of rocket propulsion and rocket flight on which all military and experimental calculations are now based.



*BY ANY OTHER NAME—Before there was a White Sands Missile Range there was a White Sands Proving Ground. This name*

*was given to the range from its conception on July 9, 1945 and remained that way until May 1, 1958 when the Department of the*

*Army changed its name. But even 22 years later it's not uncommon to find mail still addressed to WSPG.*

The MISSILE RANGER newspaper is published weekly as a civilian enterprise in the interest of the military and civilian personnel of White Sands Missile Range, N.M., by Wendell Faught. It is not an official or semi-official Department of Defense publication.

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# Missilania

## New checkpoint added

Transportation officials at the range have announced the addition of a checkpoint to the El Paso bus run.

Starting Monday there will be two buses at the Bassett Shopping Center which will leave promptly at 6:20 a.m. for the range.

Bus fare for the Bassett point is the same as for the Eastgate Shopping Center—\$12.40 and \$1.50 single fare.

Personnel who plan to take the Bassett run and leave their car must park it in the unpaved parking lot east of the Popular Store.

Buses for the Bassett check point will be clearly marked.

## Post Exchange hours

Post Exchange facilities will be open on July 4 during the following times: Main PX, 10 a.m.-3 p.m.; Round Up, 11 a.m.-6:30 p.m.; Service Station 10 a.m.-2 p.m. and Desert Cafe, 12-6 p.m.

The Missile Inn will be closed for the holiday.

## OWC has Cokes

Come out and join in the fun! There will be drink booths set up by the Finance Building at JFK field where they will be selling cokes from 11 a.m. to 9 p.m.

Tickets for a beautiful hand-made quilt will be on sale. The drawings for this will be during the Christmas Bazaar.



*THE GRADUATES—The first class of WSMR's NCO Development Program is shown with course completion certificates in hand. During the 40-hour training period the junior NCOs studied leadership, counseling, drill and ceremonies, preparation and presentation of troop training and billet and troop inspection techniques. The*

*second class is presently in training. From left, top row, Sgt. Charles Collins, SSgt. Frank Telford, Sp5 Rodney Johnson, SSgt. Victor Chavez, SSgt. Jesse Gordon, Sgt. Richard White and Sgt. Roger Tomlin. Middle row, from left, SSgt. S.E. Rodes, Sp5 Jerry Jenkins, SSgt. Loranzo Melonson,*

*SSgt. Brace W. Fonnest, Sp6 Thomas Clevenger and Sp4 Lawrence Beck. Front from left, Sp5 Douglas Parmeter, Sgt. Yvonne Nellum, Sgt. Nathaniel Robinson, Sgt. George Flores, Sp5 Rose Dekold and Sgt. John Bess.*

*(Photo by Sp5 Bill Garwood)*

# Countdown

**BASEBALL TOUR AND MOONLIGHT HORSEBACK RIDING**—Two tours will be offered in July by the Countdown Recreation Center. On July 22, it's off to the ballgame to see the El Paso Diablos play the Jackson Mets at Dudley Field. The cost of the tour is ONLY \$1 which includes roundtrip bus transportation and gate entrance fee. The bus will leave the Recreation Center at 5:30 p.m.

Back by popular demand—horseback riding along the Rio Grande. This tour is scheduled to leave the Recreation Center at 7 p.m. on July 26 and return approximately midnight. Cost of \$9 includes roundtrip bus transportation and three hours of horseback riding under a full moon.

Sign up early for both tours to reserve a seat. Dependents and civilians residing on post must have a notarized release form before boarding the bus. Release forms are valid for one calendar year.

**4th OF JULY ACTIVITIES**—Plan to see and hear the CLAY MAC BAND Friday at the Post Open House Celebration. They'll be playing from 11:30 a.m. to 4:30 p.m. Back at the Recreation Center you can enjoy films concerning some of WSMR's past projects. Coffee Call at 10 a.m.

**COED VOLLEYBALL**—Every Saturday at 4:30 p.m. and Tuesday at 6:30. Come down and join in the fun. This is a recreational non-competitive league.—And don't forget to sign up for the Volleyball cookout on July 8 at 5:30. Deadline to sign up for this activity is July 7.

**"MONEY—How to save it."** will be the program for Wednesday night July 9 at 7:30. Two films will be shown, BUY BUY and Using Money Wisely. We'll welcome any questions & can advise you as to who can give you professional advice on specific financial planning areas.

**PINOCHLE/SPADES**—Pinochle meets Wednesdays at 6 p.m. Spades meets on Thursdays at 7 p.m. Come alone or bring a partner. New players always welcome.

# Accident: get involved

Driving to WSMR early one morning, Sgt. Charles Kelly had no idea that he was about to play an important role in saving a man's life.

At 5:30 a.m., on June 19, as Kelly was heading to WSMR from El Paso, he spotted a one car accident a few miles east of the Dona Ana Range Camp. A late model Chevrolet pick-up had rolled, landing at the side of the road.

Stopping at the scene, he found an injured man laying in the seat of the vehicle.

"There was fuel on the ground so I reached in and turned off the truck," said Kelly, "then I got a blanket and covered the man up."

Returning to his car, Kelly radioed for help. Arlene Steuwer, a draftsman with the Facility Engineers at the range, answered his call. She had been monitoring the Sandbox Convoy. She immediately radioed the post MPs.

The driver of the pick-up, Anselmo Parra of Canutillo, Texas, had been returning from El Paso late the previous evening when the accident occurred. After the truck rolled, Parra, crawled to the road and waited for help. A car finally stopped,

but offered no immediate aid. "They told me they would send somebody back," said Parra. He then crawled back to his truck and layed there several hours until Kelly found him.

While waiting for the WSMR ambulance the National Guard arrived. Using the tailgate of the pick-up as a litter, they loaded Parra on an ambulance and headed for El Paso.

As they reached the intersection of O'Hara and War Road, a Med-Evac helicopter was spotted. The chopper landed and took Parra the rest of the way.

Parra was kept at William Beaumont Hospital in El Paso for four days and released. He sustained a broken breast bone and minor leg injuries.

Kelly, who works with ASL, showed the courage and concern few motorists are willing to express these days. He has a message he would like to extend to all people on the highway. "Get involved," says Kelly. "Everyone is afraid to stop when there is an accident. Next time stop. You never know when you might be the one needing help."

# Range sees variety of testing over past few years

"Variety" best describes the testing conducted at White Sands Missile Range during the past two years. Missiles for air defense, anti-fortification, surface-to-surface, air-to-ground and upper atmosphere research missions have flown over 4,000 square miles of the range.

Other varied tests have included work on the Army's new XM-1 main battle tank, practice flights of the NASA space shuttle trainer aircraft, and development of new laser guidance and terrain matching radar systems.

During the last two years, more notable tests were conducted on the Patriot and Roland air defense systems. Test flights of the Navy's Tomahawk cruise missile were witnessed by Secretary of Defense Harold Brown. Both TOW and Pershing missiles were also tested.

Patriot is the Army's new air defense system planned for both battlefield and continental air defense against aircraft and short range missiles. Roland is a compact and highly mobile weapon system for defense of installations and troops against low-level air attacks. The Tomahawk cruise missile is capable of delivering a nuclear warhead very accurately, while flying low and undetected.

Another unusual test was the Dust Infrared Test (DIRT) conducted by the Atmospheric Sciences Laboratory at the range. This test studied the effects of battlefield smoke and dust on electro-optical sensors, such as night vision devices and lasers. The dust for the test was produced by exploding three tons of TNT and 148 rounds of 155 mm artillery.

The Navy at White Sands conducts an ongoing program in upper atmospheric research. The desert sailors sample the outer limits of the atmosphere with rockets such as the Aries, Black Brant, Tarus Orion and the Aerobee family. Payloads launched by the Navy have been sponsored by such varied agencies as the Air Force, NASA, Harvard and the University of Colorado.

Future space shuttle astronauts continue to practice at White Sands Missile Range. Using a Gulfstream aircraft with reconfigured cockpit which simulates the cockpit of the space shuttle, astronauts practice approaches to landing at the range's Northrup Strip. Northrup Strip is a dry lake bed in which two 35,000 ft. runways have been graded.

Work also has been performed during the past months on Lance artillery missiles, HAWK air defense missiles, the Air Forces Advanced Strategic Air Launched Missile, Copperhead cannon launched guided projectiles, and other laser guided munitions. The man-portable Stinger air defense missile has been used effectively against full size drone aircraft in an air defense role.



*LONG AND SHORT—From the 35-foot Pershing artillery missile to the manportable Stinger air defense missile, missiles tested at White Sands vary drastically in size, shape and utility.*



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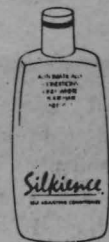
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## From Condron to AAOD

# Army air mission precedes range history

Any pilot who has been in the business long enough to get gray hair or bald will remind you that "there are old pilots and there are bold pilots, but there are no old, bold pilots."

Marvin Hedrick, affectionately called "Pappy" by his colleagues at Army Air Operations Directorate, HAFB, must be an exception to that rule. On June 19, Pappy received recognition and a pin for 25 years of service as a pilot for the Army at WSMR. Considering the nature of his work all those years, there must have been times when he had to make bold decisions. Pappy says "...no, they were just stupid."

Hedrick, now 64, and with more than 13,000 flying hours, put in his first two years at WSMR as a first lieutenant. In 1957 he became the first civilian (DAC) hired as a pilot. His hair is gray. But Pappy's face, voice and bearing reflect experience, not age. About retirement? Pappy says he hasn't even considered it. Much of the information in the following paragraphs was either supplied or verified by Marvin "Pappy" Hedrick.

The history of Army pilots and aircraft at WSMR actually precedes the missile range itself. Conventional aircraft need considerable clear and level space in which to take off and land. These attributes are found in an old, dry lake bed about six miles southeast of the headquarters building here on post.

Rumored to have been once used by smugglers as an exchange point for contraband goods, the area first was used in 1942 as an emergency landing field by Army aviators towing targets for anti-aircraft training missions of Biggs Field at Fort Bliss.

On December 3, 1942, 2nd Lt. Max H. Condron, flying such a mission, died when his aircraft crashed in an attempted landing at dusk on the dry lake bed. From that time the area was called Condron Field. It was officially named in July 1945, almost simultaneously with the birth of White Sands Proving Grounds.

Condron's first "Operations Office" was nothing more than a field telephone on a pole at one end of the field. As the proving ground developed with missile testing, Condron too, eventually expanded into a modern army operations center for light aircraft.

### Artillery observation

In a tactical situation, the party with the highest vantage point usually has odds in his favor. Mountains, buildings, trees, poles, anything that would improve observation, has been used by the soldier to gain advantage over his enemy. Balloons, and then airplanes finally put man in the air. In Louisiana maneuvers in 1940 a Piper Cub was first used by the Army as an observation platform for artillery observers.

Probably the best known, certainly the most remembered Army "liaison" aircraft, was the Stinson L-5. A single engine with

a wooden propeller pulled it along at 95 miles per hour, top speed. The little monoplane with tandem seats served many purposes.

It was called a liaison aircraft because it was used extensively to transport commanders and liaison personnel from one unit to another, and simply as a courier. The L-5 could take off and land in as little as 300 feet.

For the artillery, it became a "spotter" aircraft, carrying a forward observer who could call for and direct artillery fire from a vantage point over the front lines, usually from an altitude out of range of rifle fire. If attached by an enemy fighter plane, the little L-5 often could maneuver the faster aircraft into crashing into the ground.

### Recovery

In 1946, when the missile range commenced operations, five L-5's were assigned to Condron Field. Their prime mission was to aid in recovery of missiles and debris impacting on the then very desolate range.

Sometimes it took several days (one took a year) to locate an impact site. Pilots flew dawn-to-dusk search missions, returning to Condron to re-fuel when necessary. Later, re-fueling points were located at Holloman, Rhodes Canyon (in the central range), and at Stallion Site, in the 90-mile area.

In 1949 the L-5's were replaced with the new L-13's. This aircraft was faster and with added capabilities, but proved to be less reliable. Pilots were subjected to emergency landings almost daily. Logging 400 to 600 operations monthly, the safety record was remarkable, with only two major crashes. Three L-13 aircraft, tethered and sandbagged, were lost in an 80-miles-per-hour windstorm in May 1950.

### Larger aircraft

Early in 1946, Condron Field had a T-11 aircraft assigned. Later that year, the diminutive air base really went big-time with the addition of a C-47. This was the workhorse of the Air Force. Its prime purpose at Condron was to shuttle supplies and ranking military and civilians to and from White Sands Proving Grounds.

At one time in the late forties, two B-26 Marauders were assigned to the WSMR commanding general for range missions. The B-26, a bomber with an enviable war record, did not assist with recoveries—its missions were more sophisticated.

In June 1952, the Air Force replaced the L-13 with the L-20, a versatile, but much larger and heavier aircraft. This high-wing monoplane carried six passengers or as much cargo and was a delightful sensation to fly. Powered by a nine-cylinder radial engine, it had already served the touted Canadian bush pilots for many years.

Pilots enjoyed the L-20 for recovery missions, but it lasted only a month. In



RECOVERY OPERATIONS—Members of AAOD ready a target drone for a trip back after a test mission. This is just one phase of the recovery operation.

July, the Air Force aircraft and pilots were released, and replaced with Ordnance L-19 aircraft and pilots.

The L-19 was a much more reliable aircraft than the L-13. Hundreds of missile recovery missions were logged and the aircraft figured in roadsweeping activities—flights designed to monitor safety and security on the highway and range roads.

### Rotary wing aircraft

In the fifties, helicopters found their way into Army Aviation and its mission at WSMR. The OH-13H (Sioux), the CH-21C (Shawnee), the CH-34C (Choctaw) and the CH-37B (Mojave), all played a major role in recovery operations for several years.

The helicopters did not merely fly over and identify an impacted missile, or its parts. In many cases, these items could be put aboard or slung underneath and transported back to the base. Sometimes a missile could be lifted from a location inaccessible for a truck and carried back to base dangling from a steel cable.

At one time, a new H-13 Bell and 10 Hiller H-23 helicopters were procured for the recovery missions. Pilots found these aircraft could not perform their intended mission at the range's altitude where the base is already at 4,100 feet. Local purchases were made to provide engines with higher power ratings before the aircraft could be used.

### MARS

In the 1960's, Army Aviation at WSMR pioneered the Mid-Air Recovery System (MARS), which the Air Force continued to develop and which is still in use today. The objective was to perfect a system

whereby an airborne parachute carrying a sensitive package, such as a drone or instrumentation, could be caught in mid-air and returned to base without damage or compromise. Credit is due Major Myron C. (Rusty) Wilson, then Army Aviation commanding officer, for conducting the entire series of recovery tests without accident.

Two Army aircraft figured prominently in these experiments, the CH-37B (Mojave) helicopter and the L-19. The big H-37 was the retrieval aircraft, while the L-19 stood off a few hundred feet to monitor the action for safety purposes and to provide a camera chase plane.

### Pilots change

Through the years, Army Aviation at WSMR has been staffed with a variety of pilots. The first five pilots, assigned on September 6, 1946, when non-commissioned officers, four master sergeants and staff sergeant. In 1949, these were replaced with officer pilots. In 1957, Civil Service provided some pilots, and in the mid-sixties, a large part of the recovery operation was let out to civilian contractors, who furnished both pilots and aircraft to augment the military operation.

### Outstanding record

In 1976, the Army Aviation Accident Prevention Award of Honor was presented to the Army Air Operations Directorate (AAOD) for 20,000 accident-free flying hours. Officials said that the feat was exceptionally noteworthy because of the climatic conditions at WSMR. The lower density of high altitude lessens an aircraft's power and increases flight hazards. As of

• Continued on Page 37



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## Hall of Fame

# Range honors 6 past employees

Six former range employees have been selected as the first inductees into the White Sands Missile Range Hall of Fame.

The Hall of Fame was established to honor past employees who made outstanding contributions to the range mission. The six nominees to be inducted during a special ceremony on July 4 are: Benjamin E. Billups, Gabriel J. Brillante, Frank S. Hemingway, Dr. Clyde W. Tombaugh, Col. Harold R. Turner and Dr. Wernher von Braun.

WSMR officials feel the Hall of Fame allows the range to recognize its outstanding past employees. "Through the years, White Sands has been privileged to have more than its share of highly talented people," one official said. "The Hall of Fame is one way to express our appreciation to these highly dedicated workers."

The special induction ceremony will take place at 5 p.m. in front of the Headquarters Building during the range's July 4 Open House. New Mexico Senator Harrison Schmitt will be the guest speaker. The ceremony also will include a 50-gun salute honoring the nation and retreat ceremonies.

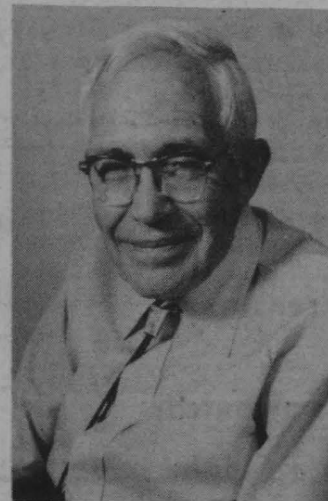
The Hall of Fame, located in building 122 on range, will be open for inspection throughout the day. Photographs of the inductees, their commemorative medallions and certificates of induction will be on display in the hall.



**Gabriel J. Brillante**

Gabriel J. Brillante worked at White Sands Missile Range from 1953 through 1974. He retired as Public Affairs Officer. He was the founder, and later curator, of Missile Park. He was instrumental in implementing much of the range's off-range public relations program, as well as improving it and developing it into what is considered one of the Army's best long-range public relations endeavors. The off-range program, called "Project Understanding," was considered so outstanding that in 1968 WSMR was selected as one of the Department of Army entries in the Silver Anvil competition. This competition, sponsored by the Public Relations Society of America, is regarded as the most prestigious recognition of public service and public affairs efforts in the United States. His widow, Francine, lives in Ruidoso, N.M.

the main range when needed. He also directed the establishment of corridors from Texas, Arizona and Utah over which launches into the main range are conducted. Although his primary contributions were at WSMR, he directed numerous joint-range studies and coordinated developments. Through this effort telemetry standards and timing standards were developed which are in use worldwide today. Hemingway lives in Las Cruces, N.M.



**Dr. Clyde W. Tombaugh**

Dr. Clyde W. Tombaugh worked at White Sands Proving Ground from 1946 to 1955. During that time he supervised the optical photographic tracking system. He originally was invited to the range to evaluate the potential of an experimental missile tracking telescope which had been adapted to a World War II M-45 machine gun mount. Early results from test films were disappointing, but Tombaugh improved the system plus exerted beneficial influence on other forms of optical instrumentation as well. Through his application of astronomical observation techniques, optical design and photographic processes, he developed a specialized telescope fleet to obtain scientific data on rocket flights. His pioneering efforts had a lasting affect on the design, development and application of the use of a wide variety of optical instruments such as cinetheodolites and high speed photography on missile testing technology. He lives in Las Cruces.

Col Harold R. Turner served as the first commander of White Sands Proving Ground from 1945 to 1947. He also was a member of a group of military officers and civilians who selected the site for the missile range in the fall of 1944. As the first commander, Turner had the task of getting the proving ground ready to test rockets. Not only was the site bare, it was still called "that place in the desert." He is credited with naming the installation. It was his decision to put the administration area at the foot of the Organ Mountains. After the war he was informed 300 railroad carloads of captured German V-2 components were in Las Cruces. He brought them over the San Andres Mountains and developed a shop to reassemble the missiles. The first 28 V-2s were fired during his tenure. Turner had no precedents or policies to follow in establishing the range. But he established an installation that would be the birthplace of America's missile and space activity. His widow, Virginia, lives in El Paso, Texas.



**Dr. Wernher von Braun**

Dr. Wernher von Braun worked at White Sands Proving Ground from 1945 to 1950. During that time he was under contract to the U.S. Department of Defense, Ordnance Department, as technical advisor to the range. Von Braun, with his team of German rocket scientists, directed high altitude firings of the V-2 missile. He participated in the development of the two-stage Bumper-Wac, a V-2 carrying a Wac Corporal missile as the second stage, which reached an altitude of 250 miles over the range. Between 1947 and 1950, the group was engaged in the development of an experimental V-2 boosted supersonic ramjet missile called Hermes II. His widow, Marie, lives in Alexandria, Va.



**Benjamin E. Billups**

Benjamin E. Billups served at White Sands from 1951 to 1973. Upon retirement he was chief of the Plans Office. When computers were first installed on range, Billups was responsible for organizing and developing a data reduction branch for producing data in volume. His planning and implementation of a real-time computer system opened the way for White Sands to test large rocket systems in an over-land flight corridor through populated areas. Billups guided the successful development and implementation of the multi-million dollar business, scientific and engineering computer complex which will continue to serve the needs of the range through the 1980s. His widow, Wilma, lives in Las Cruces, New Mexico.



**Frank S. Hemingway**

Frank S. Hemingway worked at the missile range from 1947 to 1977. When he retired he was technical director of the National Range Operations Directorate. He was responsible, more than any other person, for the technical leadership in developing WSMR from a "lashed-up facility" for exploring the potential of missiles as weapons, using captured German-built V-2 rockets, to the modern testing range it is today. Hemingway pioneered the electronic instrumentation systems at the range. As top manager at the range he fostered innovations in planning to meet testing requirements of new systems still in the conceptual stage. He directed the expansion of WSMR to include adjacent call-up, or extension, areas which provide additional space nearly equal to



**Col. Harold Turner**

### 1947

The Suggestion Committee was organized June 30, 1947, with Lt. Col. H.L. Karsch as chairman. Wayne Roemersberger was a member of the committee.

Government-owned buses to transport personnel from El Paso, Alamogordo and Las Cruces were authorized by regulation early in 1948.

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*STRAIGHT AS AN ARROW—A Chaparral air defense missile streaks to meet its target on the sprawling range. This is*

*just one of the many systems that undergo test and evaluation here at WSMR.*

## WSMR road blocks designed for public safety

To a number of people they're an inconvenience and if you're trying to get to that important appointment in a hurry they can become a frustrating experience. The funny thing about it is that they are for your benefit.

The sole purpose of the road block program of White Sands Missile Range is the safety of the motoring public. Command policy is to ensure that traffic delays are kept to a minimum and that road blocks are set only when necessary.

While there have been missile impacts on range roads and on the highway (U.S. 70) running across the range, there has never been an injury or fatality reported as the result of a missile test firing or other hazardous test operation on the range. This perfect safety record has stood for 31

years—thanks in part to the road block program. WSMR officials are determined to keep that record intact.

Missile test firings requiring road blocks are not scheduled on a regular basis and are not always known far in advance. The range firing schedule is subject to change without notice or on very short notice.

However, current information concerning road blocks is available to the public at nearly all times. Any motorist, or anyone planning to be driving in the area within the next 12 to 24 hours, may obtain current road block information by telephone by dialing (505) 678-1178 at any time, day or night. (This is a local call to White Sands Missile Range from El Paso, Fort Bliss,

Las Cruces, Alamogordo and Holloman Air Force Base.) On normal working days—7:45 a.m. to 4:15 p.m.—the Public Affairs Office, (505) 678-1134 or 678-1135, also can provide up-to-date road block information.

Road block announcements also are carried each day during the week on four radio stations in the area—KALG and KINN in Alamogordo, and KOBE and KGRT in Las Cruces. In addition, road block information appears each day (if there are blocks scheduled for the following day) in two afternoon newspapers: the Alamogordo Daily News and the Las Cruces Sun-News.

Currently, WSMR is averaging about two road blocks a day on U.S. Highway 70, which runs across the range between Alamogordo and Las Cruces. Occasionally it is necessary to set up road blocks on some of the other highways running adjacent to the range, such as U.S. Highway 54 between El Paso and Alamogordo, and U.S. Highway 380 between San Antonio and Carrizozo, New Mexico.

The authority to block state roads is granted by the New Mexico State Highway Commission and has been in use since 1948.

Road blocks seldom last more than one hour at a time. The average duration is about 45 minutes. (Of course, your delay by a road block could be anywhere from five minutes to nearly an hour, depending on how long the block has been in effect when you arrive.)

Road blocks are most likely to be encountered during normal duty hours, Monday through Friday. However, occasionally it is necessary to schedule test firing operations, requiring road blocks, at night and on Saturdays or Sundays. Ordinarily, such night-time and week-end firing missions occur only a few times a

year. And road blocks resulting from such odd-hours missions usually are announced and publicized well in advance; thus motorists required to travel the affected routes regularly may plan their trips for a minimum of inconvenience or so as to avoid being delayed.

Road blocks are manned by members of the 259th Military Police Company of White Sands Missile Range. Their vehicles are equipped with two-way radios that monitor the Range Control communications network and also maintain direct contact with security and emergency organizations on the main post. Emergency telephones also are available at those locations where road blocks are scheduled most frequently. Minimum comfort facilities are available at these road block sites.

Missile launching facilities are situated in the extreme southern end of the range. It usually is necessary to fire over U.S. Highway 70 in a northerly direction. In some instances, the cleared portion of the highway is within the safety area or impact zone for first-stage (booster) motors or other falling debris. For some types of tests, airborne targets are flown over this highway. At some road blocks, motorists have the opportunity to witness test operations at long range, from a safe vantage point.

The WSMR Command regrets the inconveniences to motorists caused by road blocks, but emphasizes that there can be no compromise with safety. The cooperation of the motoring public is sincerely requested and is greatly appreciated. By cooperating with Military Police members assigned at road blocks and putting up with occasional brief traffic delays, highway travelers are making a valuable contribution to the Nation's defense program.



*ANOTHER ROAD BLOCK—This is what a road block out at the range looked like back in 1963. It has pretty much stayed the same in format although styles have*

*changed. The road block program at the range is designed to keep the public from any unnecessary hazard.*

# The shape of things to come

by Debbie Bingham

Predicting new weapons systems which might be tested at White Sands Missile Range in the next 10 years is impossible.

Generalizations are all long-range planners now have. They say future developments depend on things like the capabilities of potential adversaries, political considerations, available technology—and how much money Congress is willing to allot to research and development.

But this national range has always been involved testing things of the future. It's no different now, 35 years after the range was founded.

In the summer of 1975, WSMR was selected as the site for the Department of Defense (DOD) High Energy Laser Test Facility which should be built soon. The solar furnace at the range is scheduled to continue with its alternate energy testing. In addition to supporting the first six space shuttle launches, the NASA White Sands facility plans to test the space shuttle rendezvous radar soon.

## HELSTF

A contract should be awarded soon, pending Congressional approval, for construction of the tri-service high energy laser system test facility (HELSTF) at the range.

A detachment from the Navy's high energy laser program at the Naval Sea Systems Command, Washington, D.C., was established at the missile range to test subsystems integral to the Navy's third generation of high energy laser (HEL) devices. The Navy effort is part of a DOD program centered on range which will involve participation from other services.

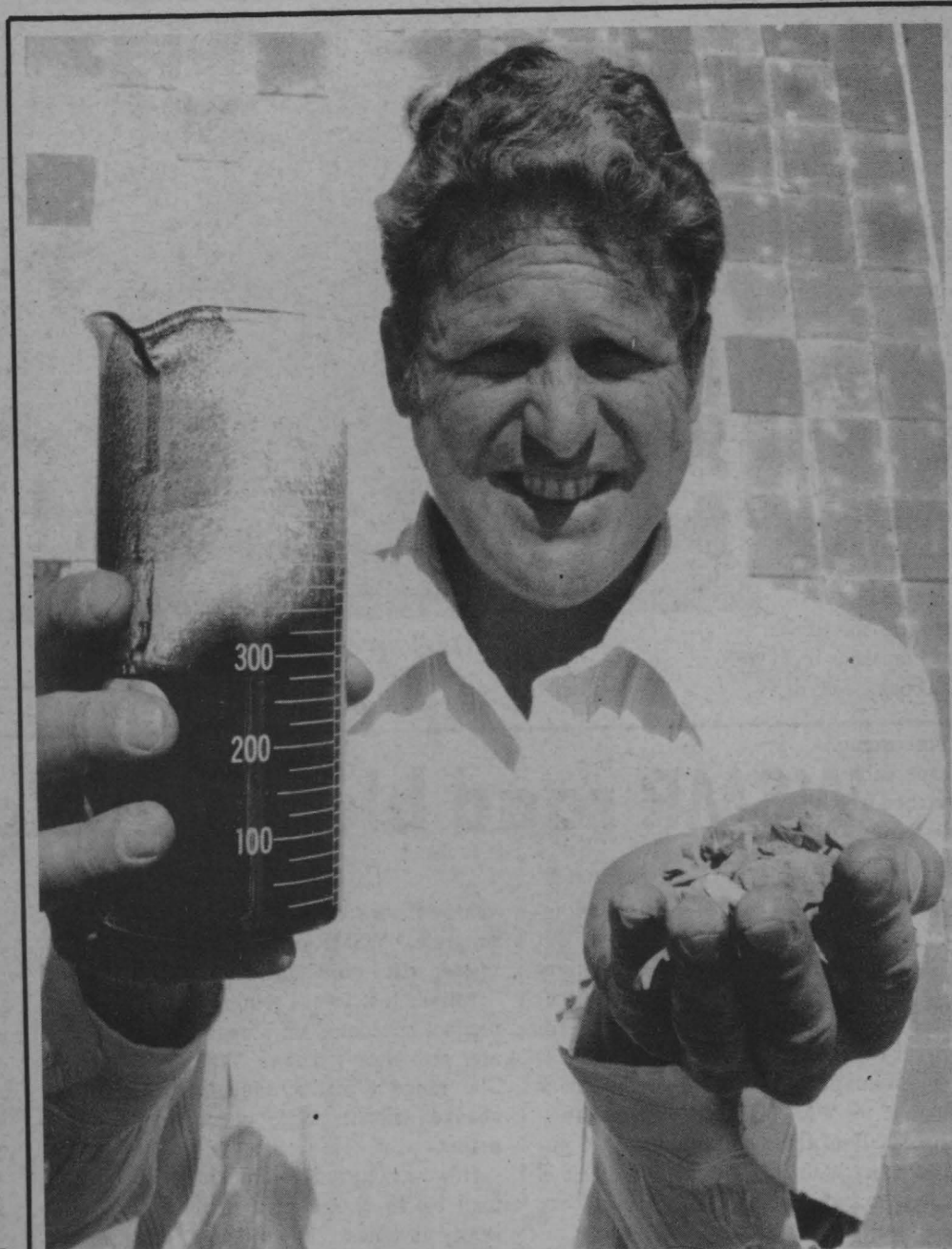
This third generation of Navy HEL devices will be used to conduct a series of tests to determine risks involved in the installation and operation of HEL systems aboard ships. The first shipboard demonstration of a high energy laser as a potential air/missile defense weapon will be conducted in the mid-1980's possibly 1984, a DOD spokesman said.

A Defense Department spokesman also said special attention will be paid to the "understanding of how a laser beam propagates through the air and interacts with a target to cause damage" during tests at WSMR.

The Navy's first generation of HEL systems was the Baseline Demonstration Laser. It was a DOD program to demonstrate the feasibility of the military application of lasers. The second generation, the Navy ARPA (Advanced Research Projects Agency) Chemical Laser, demonstrated the compatibility between a high energy laser and a precision pointing/tracking device.

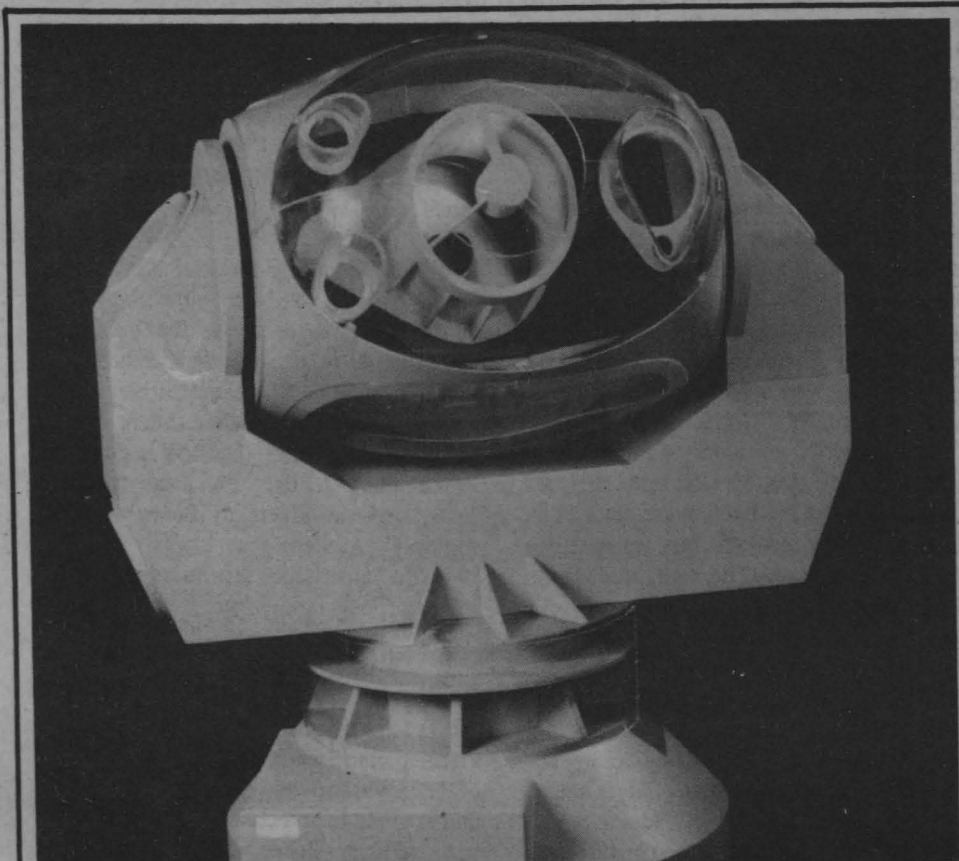
The Navy pointer/tracker, which tracks a target then directs the laser at it, is currently being tested on range. The complete system will be moved to the HELSTF site once a construction contract for the facility is awarded and building begins.

HELSTF is to be built at the Multi-functioning Array Radar station in the southeastern portion of the range. According to a Pentagon spokesman the planned facility will include the housing and operation of "test-bed laser systems," equipment for the launching, control and recovery of



**OIL SHALE RETORTING**—Dr. David Gregg of Lawrence Livermore Laboratory, Livermore, Calif., holds oil shale, a rock-like material in his left hand and a beaker filled

with oil in his right. The oil was withdrawn from the shale by heating the shale with solar energy. (Photo by Warren Weaver)



**POINTER/TRACKER**—This is a model of the Navy's pointer/tracker to be used in conjunction with the tri-service High Energy

Laser System Test Facility here. The pointer/tracker selects then follows a target and points the laser toward it.

targets and the instrumentation for gathering and analyzing test data.

## Solar furnace

The solar furnace on range is part of the Army Material Test and Evaluation Directorate's nuclear weapons effects laboratory. Currently however, about 80 percent of the time the solar furnace is operating, alternate energy tests are being conducted.

The trend will continue. Most of the future tests already scheduled at the facility deal with solar energy research.

Dr. David Gregg of Lawrence Livermore Laboratories, Livermore, Calif., used the range's solar furnace last year to conduct solar coal gasification tests. He was studying the feasibility of using solar heat to gasify the coal. In past experiments, coal was burned to reach the high temperatures necessary for the procedure.

After the coal and sunlight were chemically converted to a gaseous form in Gregg's experiment, his analysis showed about 15 percent of the energy in the gas was stored solar energy. Plus, none of the

coal was burned just to produce high temperatures.

Gregg and his associates plan to return to the national range within the year to conduct more experiments using the solar furnace in solar coal gasification and oil shale retorting projects.

Molybdenite, the chemical agent used to harden steel, is not found free in nature. Currently it is separated from raw materials through a long and costly chemical process. Los Alamos Scientific Laboratory is scheduled to use the WSMR solar furnace to test the possibility of refining the molybdenite using the sun to produce necessary high temperatures, thereby reducing the cost of the hardening agent.

As solar technology becomes more precise, new and better instrumentation is required to measure high temperature solar energy. Sandia Laboratories, Albuquerque, plan to use the solar furnace at White Sands to test the photoncalorimeters used to measure that energy at both

● Continued on Page 37

# Towering steel skeleton haunts WSMR

During the late Forties and early Fifties, a casual conversation with a visitor who had caught sight of the original Gantry Crane at the V-2 launch site might go something like this.

"What are you building over there?"

"Oh, that's the Gantry Crane, from which large rockets are serviced. Platforms are lowered around the rocket at various heights to permit access to instrumentation, etc."

"But, how does the rocket go through it on takeoff?"

Yes, that's the fabulous Gantry, a structural steel monstrosity towering over 60 feet high and 30 feet wide, assembled on tracks on which it can be moved as much as 2,000 feet away from a rocket ready for flight.

If only that crane could talk, the items of historical interest in the field of rocketry, and humorous incidents it could tell would fill a book.

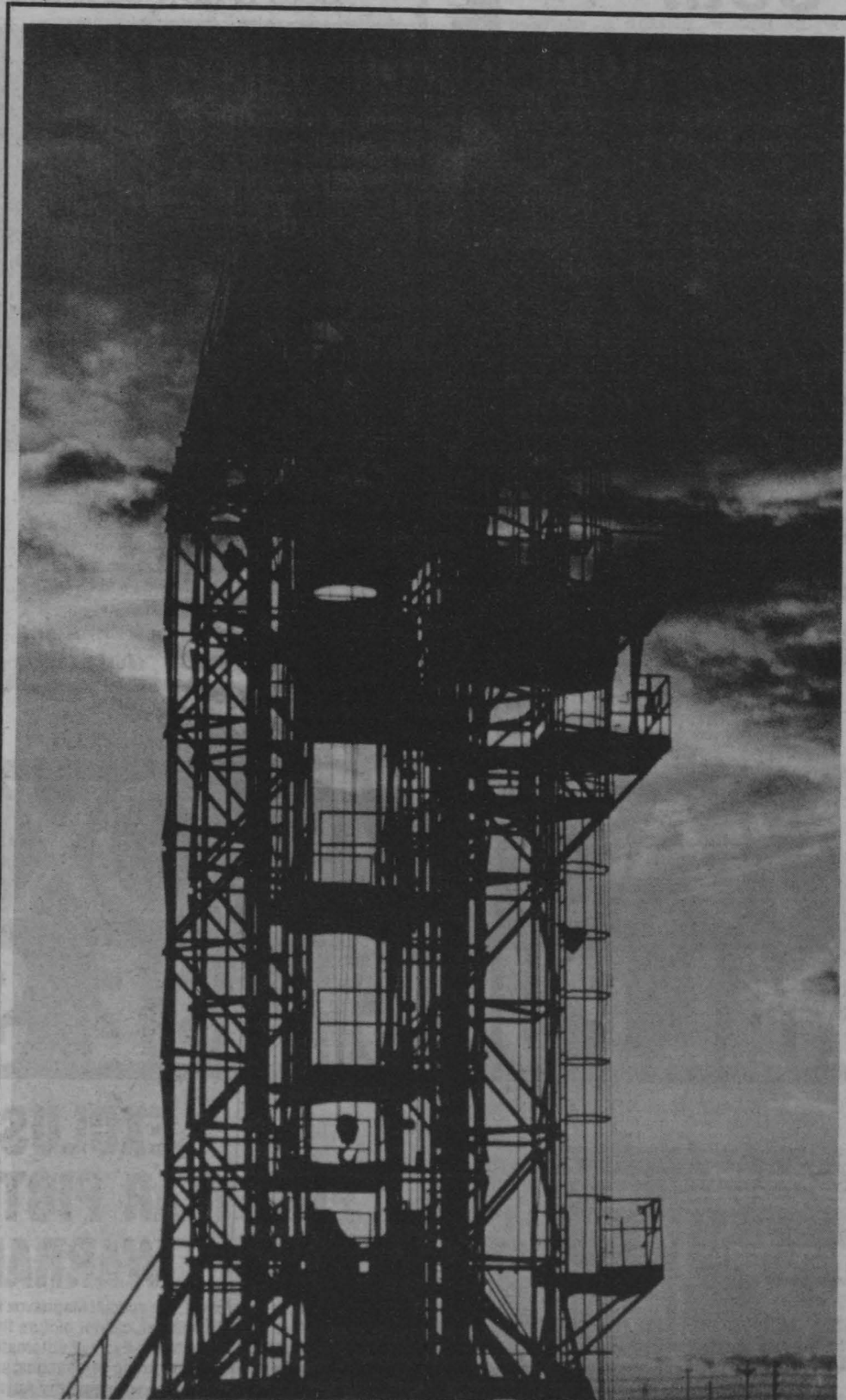
For example, there was the famous escape cable. A one-half-inch cable was stretched from the upper level platform to a pole on the ground approximately 500 feet away. On this cable were slings through which a worker could slip one arm, operate a brake with the other hand, and if he had nerve enough, shove off into space for the long ride down to the ground. Then the hand brake went bad so enough slack was left in the cable that in riding down, he would hit the ground before reaching the pole.

This was all right as long as a person hit running, but inexperienced riders would inevitably end up prone with their faces buried in the sand. Besides, the initial plunge into space on the slackened cable was so sickening that one time when the emergency siren switch (panic button) was accidentally tripped with a fueled V-2 undergoing pre-flight checkout, the mad scramble down the ladders resulted in everyone's fingers being trampled to a bloody mess on the ladder rungs by the next man above.

The escape cable was a cause for considerable exchange of money, though: "I'll bet \$5 you don't have enough guts to ride it down," etc.

Then there was the difference in weather between the top of the crane and the base. It always seemed 20 degrees colder on top in the winter and 20 degrees hotter in summer.

And winds! The wind would howl around that crane making the entire structure sway and rock. There were plenty of lights on the various platforms for working all night to get a missile ready for an early morning shoot, but no protection from the elements. The air was sometimes turned blue with profanity by workers trying to trouble-shoot a balky missile after dark with the icy wind numbing their fingers and shortening their tempers.



*A SILENT REMINDER OF THE PAST—This gantry crane at the range was actually built for the Corporal missile program,*

*but was also used to service the V-2 and several other early missiles fired at WSMR. (Photo by Jim Eckles)*

Workers around the old crane looked more like construction men than the artists' conceptions of space engineers and technicians around the base of a towering rocket. Hard hats had to be worn by all men because the crew up above were forever dropping tools and parts which would come clanking down through the crane. No missile was launched that hadn't been witness to many exchanges of threats between the upper and lower crews.

Range scheduling in those days had to consider the time required to modify the old Gantry in preparation for a missile and move it along the track. One day at quitting time, the crane was being moved down the

track to make room for a Corporal missile scheduled to arrive at the launching area at 8:30 the next morning. Locomotion was provided by a pair of in-line wheels on each of the four corner supports individually driven by four electric motors operating from a generator mounted on the crane.

Before it had cleared the launcher far enough to allow room for the Corporal transporter, one of the wheels broke in half and with a sickening lurch the crane ground to a halt. The construction crew was called and told to have the crane ready to move by 8 the next morning. Some people think changing a tire on a car or truck is

troublesome. They should have seen the two 15-ton jacks required to lift up one corner of the crane enough to install a new wheel which weighed in the neighborhood of 400 pounds and was mounted on a solid steel shaft about four inches in diameter and two feet long. It took all night long, but by 8:15 the next morning the Gantry was rolling again.

The designers of the Gantry, Cal Tech, would hardly recognize their original brainchild. It was modified from a standard shipyard gantry to fit the requirements of servicing the original Corporal missile, but was used extensively in the V-2 program as well. It was erected on a track running through the Army Blockhouse area from southwest and northeast. It has since been moved to a north-south track and has been modified through the years to service other missiles including the Viking, Blossom, Bumper, Hermes A1 and Hermes II.

Since these varied from about 20 inches in diameter and 20 feet in length to 60-inch diameters and 60-foot lengths—some with wings, some with forward control surfaces and some with only tail surfaces, and all requiring access at various levels—outrigger platforms, hoists, ladders, sprinklers, guardrails, etc. sprouted out until the Gantry looked like a structural steel designer's nightmare.

After all these modifications had been made, there was considerable anxiety over the possibility of the Gantry collapsing. It sagged, the structural members bent, the wheel supports bowed and the wheel rims snapped off. But after beefing up the structure, spreading the tracks and removing excess weight, everyone relaxed again and it was a good many years before it was replaced by a new gantry crane—the old telescoping ladders on which only one man could work were replaced with platforms at various levels so that dozens of men could be working simultaneously.

In addition to being an antique of the Missile Range, it has the enviable reputation of having had a part in initial test of numerous types of rockets whose flights varied from "just over the fence" to 250 miles above the earth's surface.

Picture, if you can, a weirdly painted rocket, towering above the launcher, oxygen vapor trailing off, men scurrying about making last minute checks, intercoms buzzing, and the old Gantry starting to creep down the track away from the rocket with the motors whining and the wheels screeching. What weird unearthly feeling when witnessed at daybreak on a cold wintry morning, seemingly miles from civilization and surrounded by desolate waste land. Those were the early days of man's attempt at space flight, and the pioneers will always remember with humor and affection the fabulous Gantry at White Sands Missile Range.

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# Rockets: from fireworks to weapons

Sometime during the 11th century the Chinese discovered how to make a simple rocket using gunpowder for fuel. It didn't take the military leaders long to realize that the rocket could be used in defense of the great China Wall. They strapped the rockets to their arrows and greatly extended the range of the bow and arrow.

Centuries later at White Sands Missile Range rockets are used to push guided missiles to their targets. Rocket engines are also used to propel test instruments and experiments into the upper atmosphere over Southern New Mexico. These rocket engines used today work on the same principles that made the Chinese fire arrows so effective.

In the 20th century the term "rocket" has become a household word. Huge rockets carried man to the moon and back. Because of rockets, Americans enjoy instantaneous world-wide communication via satellite. We even get a daily cloud cover picture of our area taken from a satellite which was launched into space by a rocket. Soon people may be riding in rockets on a regular basis to get to work in a space station. In short, the rocket is the key to the exploration of the other worlds in the universe.

## Chinese the first

According to historians, the Chinese built the first working rockets. They were also the first to use them for military purposes. In A.D. 1232 some ingenious military leader used arrows powered by small gunpowder rockets to successfully defend the city of K'ai-Fung-Foo against the invading Mongols.

From that time until the 20th century, the rocket had its ups and downs. It was quickly introduced in Europe in the 13th century as a firework and as a weapon. During the Renaissance every army had a rocket corps. But artillery improvements eventually made the cannon more effective because of increased range and accuracy. Occasional improvements in the rocket would bring it back into popularity but usually not for long.

During this time one Chinese official hit on the idea of using rockets to propel a man through the air. It was around 1500 that Wan Hu rigged a pair of kites together with a chair attached in between. He then tied a series of military rockets to the kites and drafted a group of coolies to light the rockets. Not wanting to miss out on the chance for fame, Wan Hu decided to be his own test pilot. According to reports, he sat in the chair and gave the order to light the rockets. There was a lot of noise and a great burst of flame and smoke which blocked everyone's vision. When the smoke cleared, Wan Hu was gone. The story ends there and the reader is left to his own conclusions.

## Military use

Used as a barrage weapon the rocket often proved effective for military purposes. In the late 1700's Haider Ali, Prince of Mysore, India, used iron rockets to defeat

a top British unit in battle. The British, in turn, used the rocket against the United States.

In the War of 1812 the British used rockets developed by William Congreve, one of the few men who worked to improve early rocket design. In "The Star-Spangled Banner" the reference to the "rockets red glare" is a description of the British bombardment of Fort McHenry with Congreve rockets.

Congreve and an American, William Hale, did a lot during the 19th century to force armies to reactivate their rocket corps. Congreve's success came in his ability to extend the range of his military rockets to as much as 3,000 yards. Hale attempted to solve the problem of low accuracy by spin stabilization, a technique still in use today. As the century progressed artillery technology by-passed the rocket and in the beginning of the 20th century rockets were more a matter of speculation than reality.

## Theory

Authors Jules Verne and H.G. Wells wrote about the use of rockets and space travel and serious scientists soon turned their attention to rocket theory. Konstantin

Tsiolkovsky, a Russian, worked on rocket design and theory in the early 20th century. In his numerous writings he proposed space exploration by rocket, liquid propellants, the multistage rocket and space stations.

Hermann Oberth, a German scientist, also contributed to the theory and design of rockets. In 1923, he published a work in which he proved flight beyond the atmosphere is possible. In a 1929 book called "The Road to Space Travel" Oberth proposed liquid-propelled rockets, multistaged rockets, space navigation, and guidance and re-entry systems. He also advanced the idea of a transatlantic postal rocket for quick mail delivery. It was taken seriously at the time but never attempted.

From 1939 to 1945 he worked on German war rocket programs with such notables as Wernher von Braun. After the war he came to the United States where he again worked with von Braun. During the war one of the weapons the scientists were designing was reminiscent of Oberth's postal rocket. The German's wanted to build a rocket which would carry a bomb from Europe to strike New York City.

## Father of the rocket

Most historians call Oberth and Tsiolkovsky the fathers of modern rocket theory.

If that is so, an American, Dr. Robert H. Goddard, can be called the father of the practical rocket. His designs and working models eventually led to the German big rockets such as the V-2 used against England in WWII. All three men are enshrined in the International Space Hall of Fame in Alamogordo, N.M.

Goddard started working with rockets in 1915 when he tested solid fuel models. In 1917 when the U.S. entered WWI he worked on perfecting rockets as weapons. One of his designs turned out to be the forerunner of the bazookas, a tube launched, recoilless missile, 18 inches long and one inch in diameter. It was actually tested in 1918 but the war ended before it could be used against German tanks.

In 1919 he published a paper entitled "A Method of Reaching Extreme Altitudes." In it he concluded that a rocket would work better in a total vacuum than in our atmosphere. This was against the popular belief of the day that a rocket needed air to push against. He also suggested that a multistage rocket could reach very high altitudes and even reach the escape velocity of the earth. The press scoffed at his ideas and public reaction was poor.

Goddard went on experimenting and on March 16, 1926 he flew the first liquid-fueled rocket. After the initial success, he flew other rockets in rural Massachusetts until they started crashing in his neighbor's pastures. The local fire marshal declared his rockets were a fire hazard and ended his tests.

## Stage is set

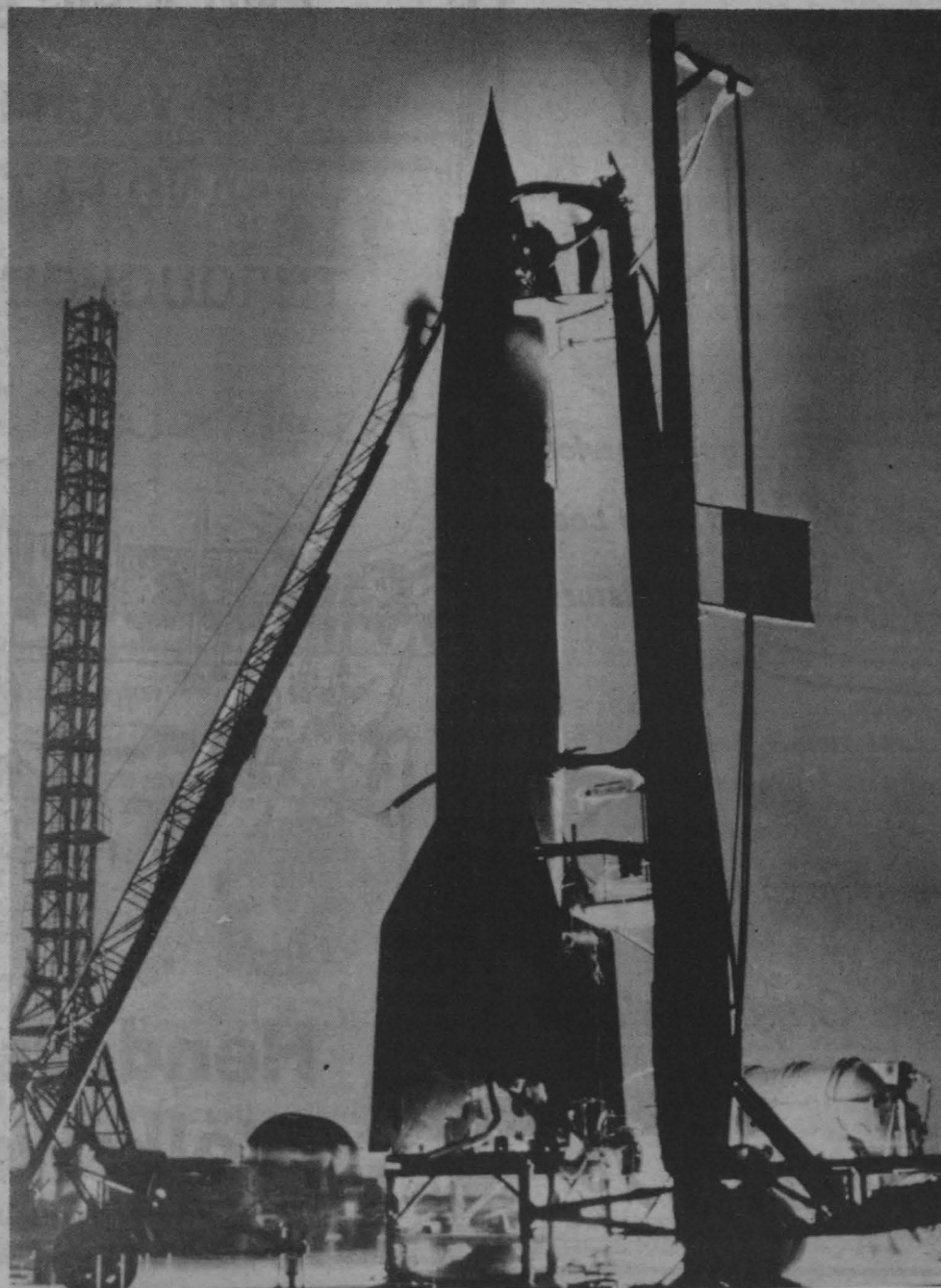
Charles Lindbergh came to Goddard's rescue by helping him get a grant from the Guggenheim Foundation. With it Goddard moved to Roswell, N.M. where he could experiment without endangering anyone.

There he developed the first gyro-controlled rocket guidance system and was eventually flying rockets faster than the speed of sound and at altitudes up to the 7,500 feet. It was a huge improvement over the first liquid-fueled rocket which went 220 feet and was in the air only 2.5 seconds.

During WWII, the U.S. military saw little use for rockets. The Army did use bazookas but it was the Germans who took Goddard's ideas and turned them into real weapons. Goddard died in 1945 just as he started to receive some recognition for his work. One of his biographers said, "It is virtually impossible to design, construct or launch a rocket today without utilizing some idea or device originated by Goddard."

## Germans and V-2

Under von Braun, the Germans perfected the large liquid-fueled rocket which culminated in the V-2 long range ballistic missile. It was the largest rocket vehicle at the time, being 46 feet long, 5.5 feet in diameter and developing 56,000 pounds of thrust or push. At the close of the war the allies captured V-2 components and the German development team surrendered to





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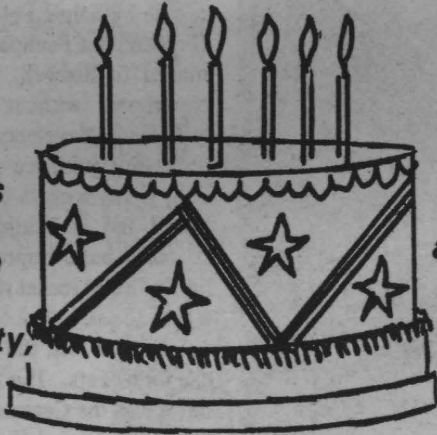
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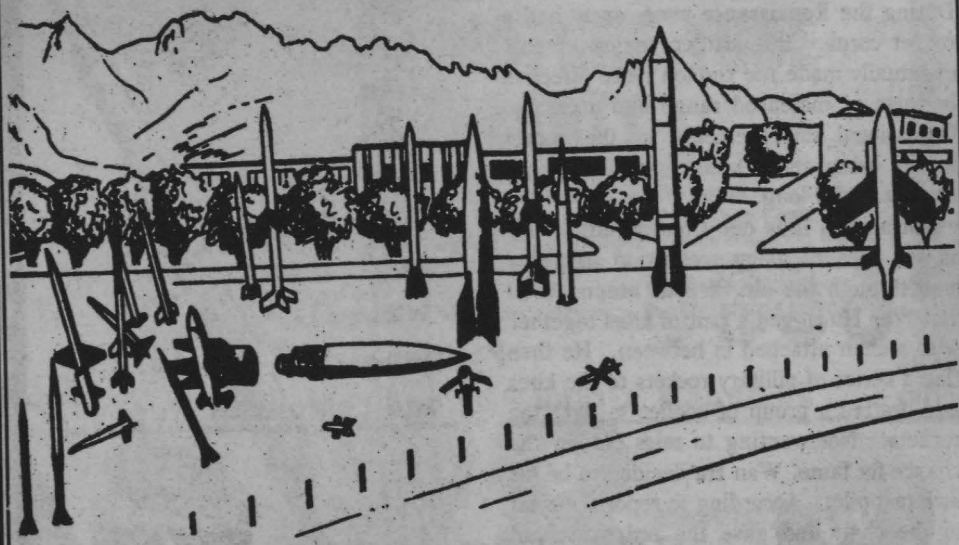
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### 1952

Front door mail service was established by the Postal Branch for residents of the Trailer Courts.

The Visitor's Bureau observed its first anniversary Jan. 23.

PIO published 5,000 copies of an informational brochure for post personnel and visitors during April.

WSPG's Civilian Payroll Section was

established June 12.

A 7-grenade burst Aerobee was fired by SCEL May 19, as one of the most impressive night shots at the Proving Ground.

The Post Library moved to its present location the week of May 28. An Open House was held for the public.

Civil oaths were taken at New Mexico A&M College by the first contingent of Co-op students during mid-July.

### 1953

"Wind and Sand" began its fourth year of publication March 26.

The PX Cafeteria opening was set for April 17, with official ceremonies for the

occasion presided over by Brig. Gen. G.G. Eddy.

Clyde W. Tombaugh was guest speaker for the newly organized Mesilla Kiwanis Club on June 16.

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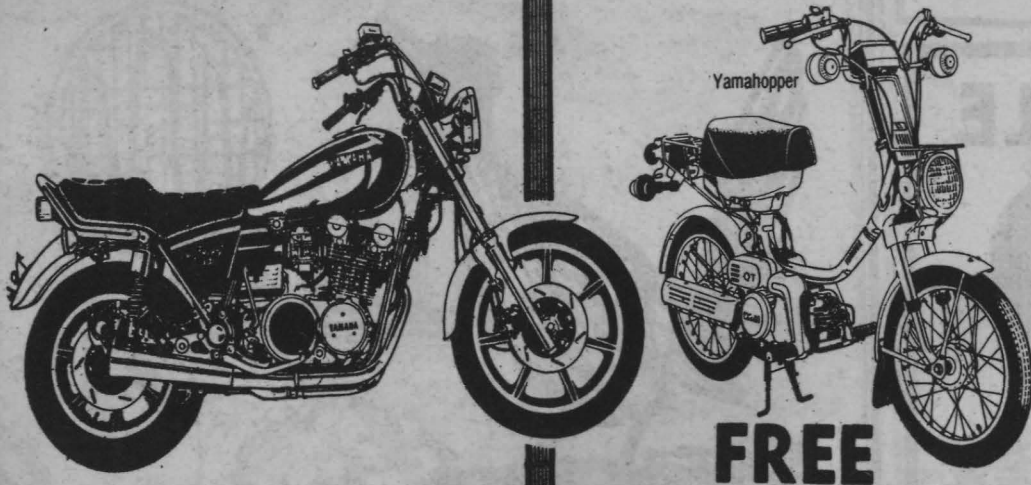
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# The Missile Ranger

Special pullout and reference section with map and schedule

## Confederate Air Force lands; Aircraft on display today

The Confederate Air Force landed at White Sands today to entertain visitors during the range's open house. All visitors are invited to inspect their vintage World War II aircraft from 12 to 6 p.m. and enjoy a flying demonstration scheduled for this evening.

Aircraft on display include a PT-22 trainer, ME-108 German courier, L-5 forward observer, C-45 cargo carrier, SNJ trainer, and Japanese Val dive bomber.

During the past 20 years, the Confederate Air Force members have assembled one of the most complete collections of flyable

World War II combat aircraft in the world.

The aircraft of the Confederate Air Force "Ghost Squadron" are symbols of a time when the greatest tyrannies ever known attempted to enslave the world. It was also a time in which the citizens of this nation take great pride.

Men of the Confederate Air Force will be manning all displays. Feel free to visit with them and learn more about their worthwhile organization. Buses will be running every 45 minutes from the main post to Condon Army Airfield.



**GHOST SHIP**—This replica of a Japanese VAL is among the aircraft being displayed during the White Sands Missile Range open house. Five aircraft of the famed

Confederate Air Force are also available for visitor viewing. A flying demonstration is scheduled for 7 p.m. on July 4th.



DEPARTMENT OF THE ARMY  
US ARMY WHITE SANDS MISSILE RANGE  
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002

STEW-PA

4 July 1980

SUBJECT: Open House Message

FRIENDS AND NEIGHBORS OF WHITE SANDS MISSILE RANGE

On behalf of all the employees and military at White Sands Missile Range, welcome to our Open House. We have opened the installation so our neighbors and friends can help us celebrate Independence Day and the 35th anniversary of the range.

We appreciate the cooperation you have given us in the past. The good relationship we have developed over the years has a positive bearing on the accomplishment of our vital mission. Without your support White Sands Missile Range could not exist. In the future we hope to continue to merit your backing.

To help you understand our work, many displays and demonstrations are scheduled. In addition, we have planned many events which should be enjoyable for the whole family.

Thank you for coming. I hope your visit will be enjoyable and rewarding.

*Duward D. Ball*

DUARD D. BALL  
Major General, USA  
Commanding

## If you need some help, call 678-1374 or 1363

We hope your day at White Sands is very pleasant and enjoyable. If, however, you should become ill or require medical attention, a first aid station has been located on the west end of the main military equipment display, map location #14.

Doctors, nurses, medical assistants and

an ambulance crew are available.

If you should become ill away from the display area but near a telephone, the number of the medical aid station is 678-1363. Should you not be able to get through on that telephone number, call the visitor assistance booth at 678-1374.

## Looking for a place to eat

**Hungry? Thirsty? No problem!**

Various food and beverage outlets are available for your use during the open house.

A barbeque combination plate is being featured at the NCO Club at \$3 for adults and \$1.75 for children. Fried chicken with all the trimmings and a salad bar will be offered at the Officers Club at \$3.50 for adults and \$2 for children.

The snack bars at the bowling alley and golf course are open serving hot and cold sandwiches, snacks, beer and soft drinks.

The women of the range Wives Club will sell soft drinks in the midway area. Also located in the midway will be a booth serving up buffalo burgers, chili and draft beer.

Near the softball fields and the midway, the range's Youth Activities Center will have booths selling burgers, bratworst and hot dogs. The NCO Club will also operate beer stations with snacks at the John F. Kennedy parade field and near building 122 where the Hall of Fame is located.

# Welcome! Here's w

Welcome to White Sands Missile Range, the birthplace of America's missile and space activity!

A separate concise schedule of activities has been provided on this page for your convenience. Also provided is a quick reference map key. You may find it convenient to pull out this center insert and keep it with you throughout the day.

For early arrivers and sports participants, our troop dining facility at map location #23 will serve breakfast from 7 to 10 a.m. Nominal payments are required with lesser rates for children.

A 10,000 meter run will begin at 7 a.m. All participants will register and begin the race at map location #2. Trophies will be presented to winners at the same location at 9 a.m. The first 100 finishers will be given a T-shirt.

Tennis players from the area will begin a two-day tournament at 8 a.m. The matches will be scheduled at post tennis courts at map locations #6, #7 and #21. Spectators are welcome at all sporting events.

At 9 a.m., the golf tournament begins. The White Sands golf course is one of the finest around and should prove a challenge to all. The golf course is at map location #3.

Softball tournaments for women and men will begin at 9 a.m. Several teams for both divisions are scheduled to participate. The women's softball tournament will be held at Goddard Field, map location #4; and the men's tournament will be at Goddard Rock Pile, map location #5.

A three-day bowling tournament begins at 10 a.m. at map location #8. A snack bar is also available in the bowling alley for refreshments.

Post swimming pools will be open from 11 a.m. to 8 p.m. For a refreshing dip, go to map location #1 or #10.

The White Sands Officers Club and Noncommissioned Officers Club will be open to all visitors. For fine food and beverages, visit the NCO Club at map location #1 between 10 a.m. and 8 p.m.; or the Officers Club at map location #21 between 11 a.m. and 10 p.m. Other food and beverage booths will be serving during the day in the midway, map areas #15 and #18.

An interesting and informative display of various military equipment is open for public viewing from 11 a.m. to 9 p.m. The display area is located within map indicator #14.

The White Sands Missile Range Hall of Fame is being officially opened and dedicated today. The Hall of Fame has been established to honor past military and civilian employees who have made outstanding contributions to the mission of the range. To visit the Hall of Fame, go to map location #19.

The midway in map areas #15 and #18 has various attractions. In addition to food and beverage sales, numerous informational booths are set up. The Clay Mac Band will be playing in the afternoon. There is a booth at the south end of map location #18 for general information and lost parents. A first aid station and ambulance crew are located at the west end of area #14. Anyone desiring information or assistance can also see any of the military policemen directing traffic or on foot patrol.

The range's Arts and Crafts Center, map location #22, has an open house scheduled between 11 a.m. and 5 p.m. In addition, an art exhibit furnished by the Crafts Center has been set up at map location #19. The Countdown Recreation Center, map location #20, is open to visitors; and Bell Gymnasium, map location #9, will be open for those competing in sporting events only.

Vintage World War II aircraft of the Confederate Air Force Ghost Squadron will be on display at Condron Army Airfield from 12 to 6 p.m. Buses depart for the display every 45 minutes from map location #17. Members of the Confederate Air Force will be available to answer your questions. The unit will perform a flying demonstration over the midway areas beginning at 7 p.m.

For your convenience, a shuttle bus route, as indicated by the dotted line on the map, has been established. The free shuttle bus will run all day between points on the route. Pick-up points to catch the shuttle are at map locations #1, #3, #16, #21 and #22.

Tour buses, originating at map location #17 will depart at 30 minute intervals between 12 and 1 p.m., and again between 6 and 7:30 p.m. The tours take about 90 minutes. The schedule will allow for a bus to depart location #17 at 12, 12:30, 1, 6, 6:30, 7 and 7:30 p.m. Each bus has a capacity of 53 persons.

Skydivers of the White Sands Missile Range Sport Parachute Club will make free falls at 1, 4 and 6:15 p.m., weather permitting. The skydivers will jump over map area #13 and should be visible from all display areas. Visitors may sit in bleachers at map location #11.

A Lance artillery missile will be launched at 3 p.m. from Launch Complex 33. Buses begin departing at 2 p.m. from location #17 for visitors who wish to view the launch. The launch should be somewhat visible from the midway area also, but that would be a distance of about six miles from the launch point.

A special ceremony featuring New Mexico Senator Harrison Schmitt as guest speaker will be conducted at 5 p.m. in front of the headquarters building, map location #18. The ceremony will include a military retreat

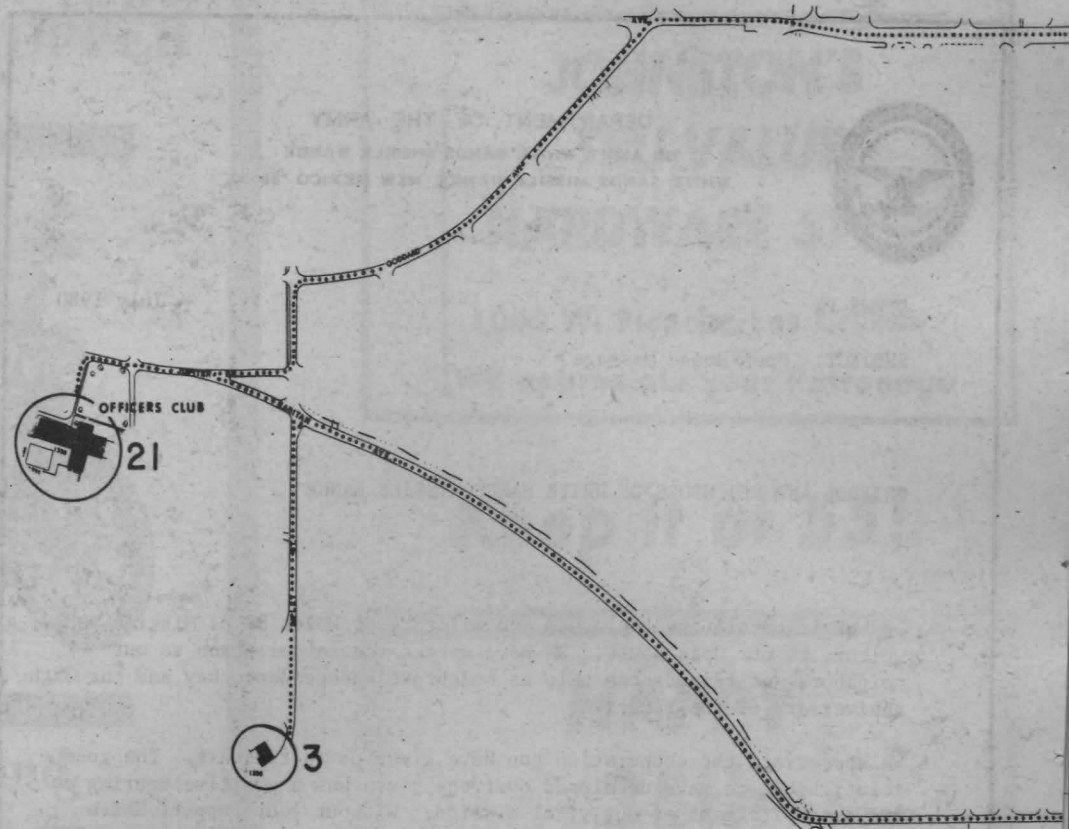
ceremony, a 50-gun salute to the nation, and induction of the first nominees into the White Sands Missile Range Hall of Fame. Preceding the special ceremony, the "All Americans" chorus will sing at 4:15 p.m. in front of the headquarters building.

At 8 p.m., in map area #11, the New Mexico Army National Guard Band will be in concert. Bleachers are available for visitors.

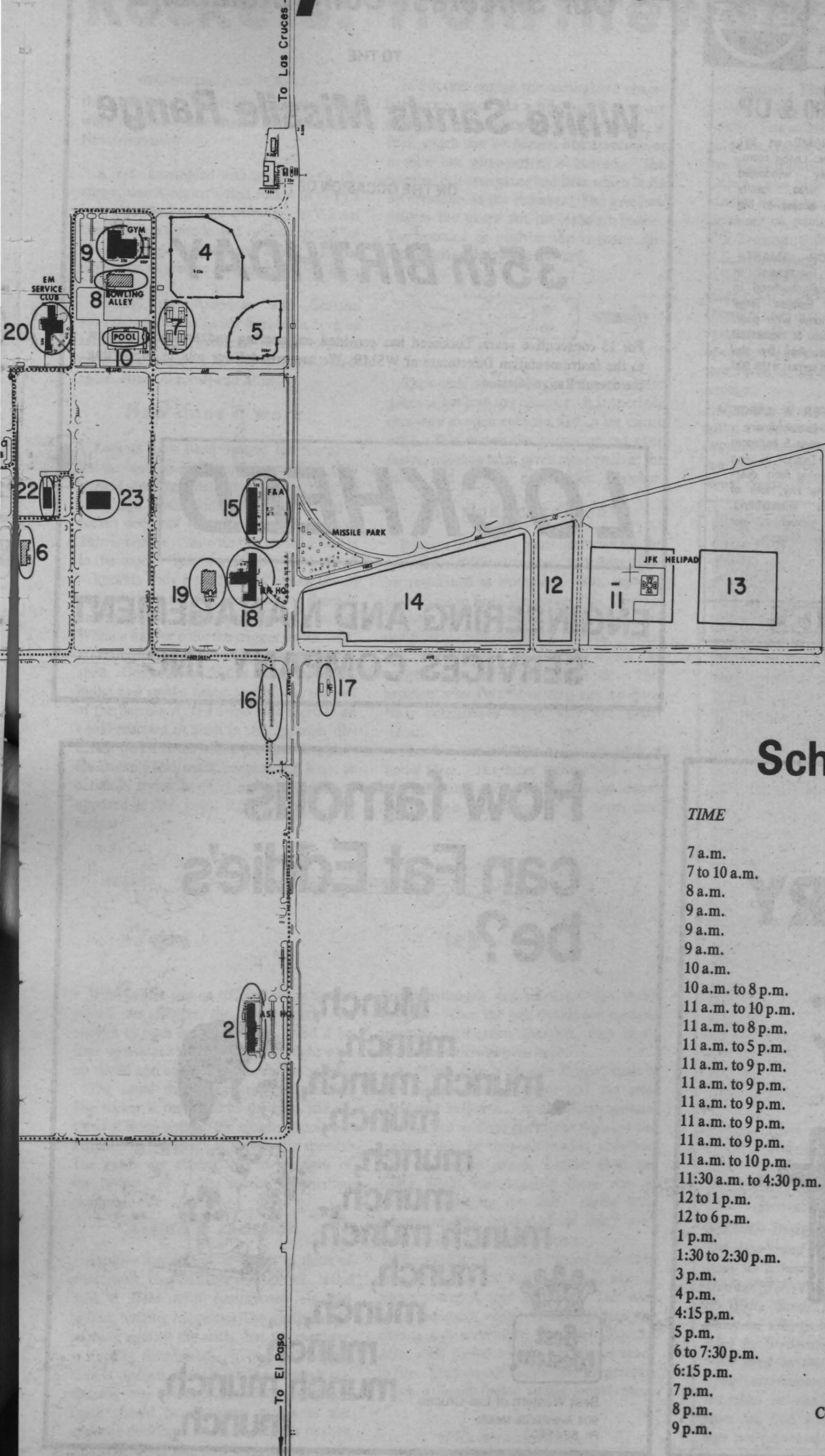
A spectacular fireworks display of over 200 aerial rounds will begin at 9 p.m. The fireworks will be set off from map location #13. The best viewing areas should be map locations #11, #12 and #14, but the fireworks can be seen from the midway also.

As you enter the range, military policemen will be providing parking directions and traffic flow assistance for your convenience. Please cooperate by parking in the designated areas only.

We sincerely hope you enjoy your day at White Sands Missile Range.



# What's planned



## Quick reference key

- 1—Noncommissioned Officers Club (Food, Swimming)
- 2—Atmospheric Sciences laboratory (10,000 Meter Run)
- 3—Golf Course
- 4—Softball Field (Women's Tournament)
- 5—Softball Field (Men's Tournament)
- 6—Tennis Courts
- 7—Tennis Courts
- 8—Bowling Alley
- 9—Gymnasium
- 10—Swimming Pool
- 11—John F. Kennedy Parade Field
- 12—Central Parking Area
- 13—Fireworks Area (Hazardous, no admittance)
- 14—Military Equipment Displays; First Aid Station
- 15—Midway Area: Food Booths
- 16—Shuttle Bus Pick-up Point
- 17—Bus Pick-up Point: Tour, Missile Launch, Confederate Air Force
- 18—Midway; Information Booths; Visitor Assistance Booth
- 19—Hall of Fame; Art Exhibit; Press Center
- 20—Countdown Recreation Center
- 21—Officers Club (Food)
- 22—Arts and Crafts Center
- 23—Troop Dining Facility (Breakfast only 7-10 a.m.)

## Schedule of Events

TIME	EVENT	LOCATION
7 a.m.	10,000 Meter Run	#2
7 to 10 a.m.	Breakfast Served	#23
8 a.m.	Tennis Tournament Begins	#6, 7, 21
9 a.m.	Golf Tournament Begins	#3
9 a.m.	Women's Softball Tournament Begins	#4
9 a.m.	Men's Softball Tournament Begins	#5
10 a.m.	Bowling Tournament Begins	#8
10 a.m. to 8 p.m.	NCO Club Open to All	#1
11 a.m. to 10 p.m.	Officers Club Open to All	#21
11 a.m. to 8 p.m.	Open Swimming for Visitors	#1, 10
11 a.m. to 5 p.m.	Craft Center Open House	#22
11 a.m. to 9 p.m.	Hall of Fame Open	#19
11 a.m. to 9 p.m.	Military Equipment Displays	#14
11 a.m. to 9 p.m.	Food and Beverage Sales	#15, 18
11 a.m. to 9 p.m.	Midway Open	#15, 18
11 a.m. to 9 p.m.	Art Exhibit	#19
11 a.m. to 10 p.m.	Free Shuttle Bus Service	#16
11:30 a.m. to 4:30 p.m.	Clay Mac Band in the Midway	#15
12 to 1 p.m.	Tour Buses Depart	#17
12 to 6 p.m.	Buses to Confederate Air Force Display	#17
1 p.m.	Skydiving Exhibition	#11
1:30 to 2:30 p.m.	Buses Depart for Missile Launch	#17
3 p.m.	Lance Missile Launch	
4 p.m.	Skydiving Exhibition	#11
4:15 p.m.	"The All Americans" Perform	#18
5 p.m.	Special Ceremony	#18
6 to 7:30 p.m.	Tour Buses Depart	#17
6:15 p.m.	Skydiving Exhibition	#13
7 p.m.	Confederate Air Force Flying Exhibition	#14
8 p.m.	Concert by New Mexico National Guard	#11
9 p.m.	Aerial Fireworks Display	#11



# Rockets: from fireworks to weapons

• Continued from Page 17

the Americans. The team and components were sent to White Sands Missile Range, New Mexico.

A V-2, assembled and launched on the range, was America's first rocket to carry a heavy payload to high altitude. A V-2 set the first high altitude and velocity record for a single stage missile, and a V-2 was the first large missile to be controlled in flight.

Jointly, the American and German scientists at White Sands worked to develop missile and rocket systems. From their work came such missiles as the Corporal, Redstone, Nike, Aerobee and Atlas.

## How does it work

Rockets have been around for centuries but no one has really understood how they worked until just recently. It was only 60 years ago when Goddard proposed that a rocket does not need air to push against. This is now obvious with the manned flights to the moon. But how do they work then?

Rockets obey Issac Newton's third law of motion which says for every action there is an equal and oppositely directed action. When a hunter pulls the trigger on his rifle, a small gunpowder explosion occurs in the shell. One reaction to this explosion is the bullet and smoke being pushed out the end of the barrel. At the same time there is an equal reaction or push in the opposite direction which is the recoil into his shoulder. He doesn't feel much because the force or action is trying to push the whole rifle as opposed to the small bullet on the other action.



If the hunter was on roller skates when he pulled the trigger the recoil might be enough to push him backwards. And if he kept up a rapid rate of firing he might pick up speed and continue to move backwards.

The same thing happens in a rocket. The rocket is the same as the rifle and instead of firing bullets, the rockets shoots out a stream of hot gases at supersonic speeds. The gases are pushed out as a result of the burning of a fuel in the combustion chamber.

## Action & reaction

Another way to look at this is to think of a long tank, shaped like a short pencil. If the tank is filled with compressed air and sealed, nothing happens. The gas is inside pushing against the walls, but the pressure is equally distributed. If one end of the tank is opened, the air pushes through the opening very quickly. According to Newton there should be an equal action in the opposite direction. There is. The air pushes on the front of the tank and if it is great enough the tank will move forward.

In a rocket engine the combustion chamber is very much like a rifle barrel or an air tank with one end open. In the rocket, a fuel, which can be burned like kerosene or a solid like gunpowder, is burned. The burning releases gases and heat which build up pressures in the chamber. The pressure pushes the gases out the exhaust nozzle. The reaction or push in the opposite direction drives the rocket forward.



The nozzle or exit hole for the pressurized gases is not just any opening. It is specially designed to open outward like an ice cream cone. This makes the gasses go out even faster, which in turn, gives more push at the other end of the combustion chamber.

## The right conditions

Rockets do best in outer space where the gravitational forces are less and there is no air resistance to overcome. But, there is also no air to keep the rocket fuel burning. Rockets work in space because they are completely self-contained. The rocket carries a fuel and an oxidizing agent like oxygen so it needs no outside air. This explains why Polaris missile can be fired from submarines while they are under water.

The fuel and oxidizer can be in solid or liquid form. The huge rockets which hurl the astronauts and satellites into space used liquid fuels like kerosene or super-cold,

liquid hydrogen and oxidizers like liquid oxygen. When the two liquids are sprayed into the combustion chamber, they ignite and burn with explosive force.

At White Sands Missile Range, most of the missile systems under test use solid fuels and oxidizers. In a solid propellant, the fuel and oxidizer are mixed together and placed right in the combustion chamber. This makes the missile smaller than one using liquid fuel because there are no storage tanks for the fuel. Some solid propellants like nitroglycerine don't even need an oxidizer mixed in with it.

The solid-fueled rocket engine has many advantages for the military. It is smaller which makes it very portable. The solid fuels are much easier to handle than the caustic and sometimes super-cold liquids. Also, solid fueled rockets are always ready to fire. They do not require the preparation which a liquid fueled rocket would need.

Much more than a rocket

Today's missile systems are much more than a rocket engine with a supply of fuel

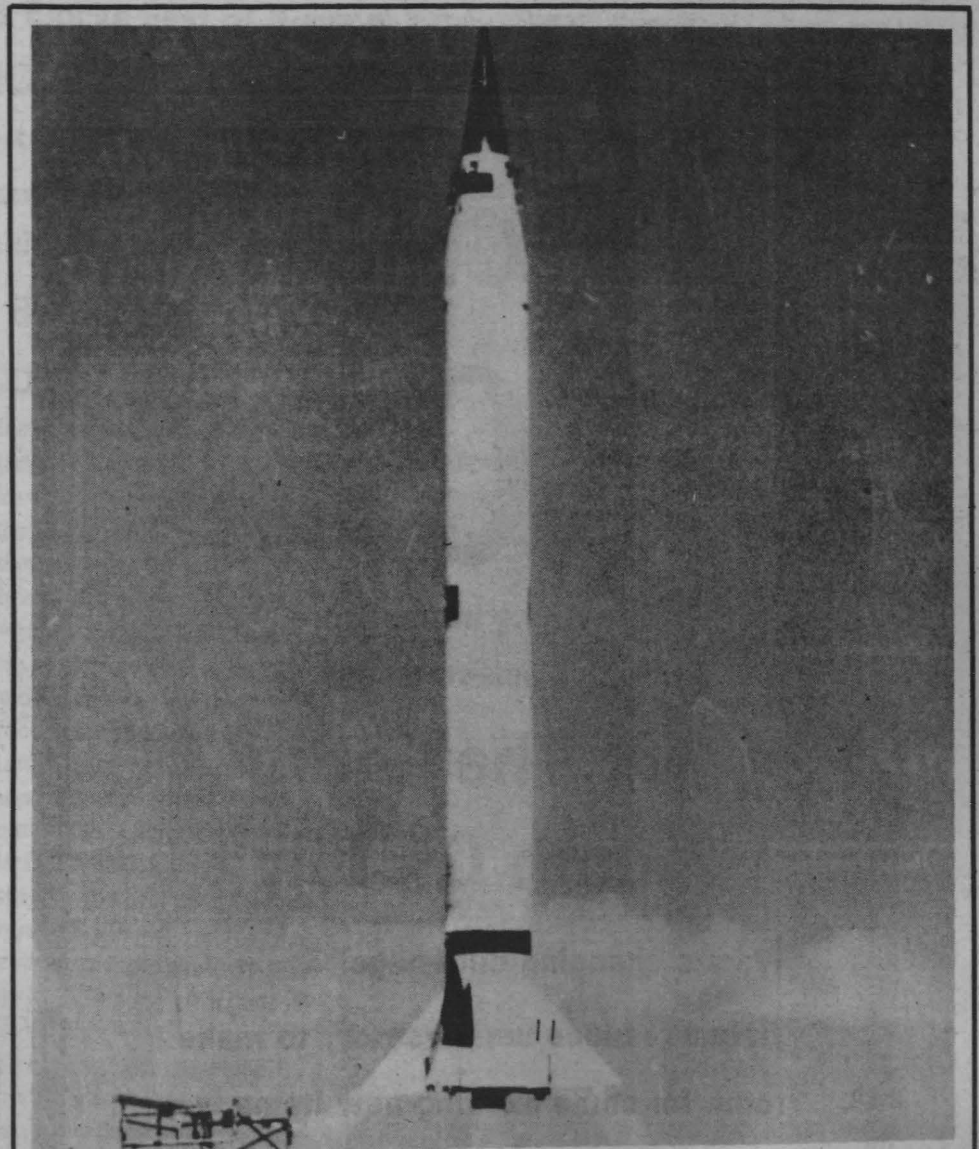
and oxidizer. There is usually some sort of payload. This can be a test package or a bomb. This missile will have some sort of guidance system to get it to its target and it has an airframe to hold all the parts together. The Missile Park at White Sands Missile Range has a wide range of missile airframes on public display. They include a V-2 along with missiles used by the U.S. Army, Navy and Air Force.

For the future scientists are looking for other types of rocket engines to replace the chemical ones now used. Any self-contained system which can push matter out an opening will produce push or thrust. Therefore, even a balloon could be considered a rocket.

One idea researchers are looking at is using a nuclear reactor to heat a gas so it expands and becomes pressurized. The gas can then be forced through a nozzle which would create the necessary opposite action

to drive a vehicle forward. Scientists have contemplated using an ion beam to push a spacecraft. This system calls for accelerating charged molecular particles in magnetic field and then beaming them out the nozzle end of the engine. Another plan calls for thrust to be provided by ejecting photons or light from the engine. These devices are theoretically possible but they lack the powerful thrust necessary to escape earth's gravity pull.

Since the turn of the century the rocket motor has gone from being a firework and little used weapon to being the key to man's dreams. The rocket has made space exploration possible. Men have already walked on the moon and exploratory spacecraft have flown past several of the planets in the solar system, sending back valuable information. The rocket is the key to open up new worlds for man to explore.



**VIKING**—Designed by the Naval Research Laboratory and the Glenn L. Martin Company as a research rocket to replace the German V-2, the Viking was first flown at White Sands Missile Range in 1949. Fourteen Vikings were built, each different from its predecessor. Ten of the group were fired on the White Sands range for upper air research. Viking No. 4 was launched at sea near Christmas Island from the USS Norton Sound, and No. 8 was not launched. Instead, it broke free from its restraining bolts during static

test thus making a premature, and unscheduled, flight at what might be called "tree top" level across the boondocks. The major structural material of the 45-foot-long Viking was aluminum. It was powered by a liquid propellant rocket engine using liquid oxygen and alcohol which produced 20,000 pounds of thrust. Vikings No. 13 and No. 14 were integrated into the Vanguard earth satellite program late in 1955 and were launched in that program from Patrick Air Force Base, Fla. In a sense, Viking is the immediate ancestor of the satellite vehicle.



XM-1 TANK—A close up view of the XM-1 tank and the XM-250 smoke grenade launcher. This is the Army's newest piece of equipment and has under gone testing here at the range. (Photo by Frank Trevino)

## White to speak Tuesday

Congressman Richard C. White of El Paso will be featured speaker Tuesday during an open meeting of the Rio Grande Chapter of the American Defense Preparedness Association (ADPA). The subject of his talk will be "Status of U.S. defense capability."

The luncheon-meeting will be conducted at the Officers' Open Mess beginning at 11:30 a.m.

White serves on the Armed Services and Science and Technology Committees. After discussing America's defense capability, he will answer questions from

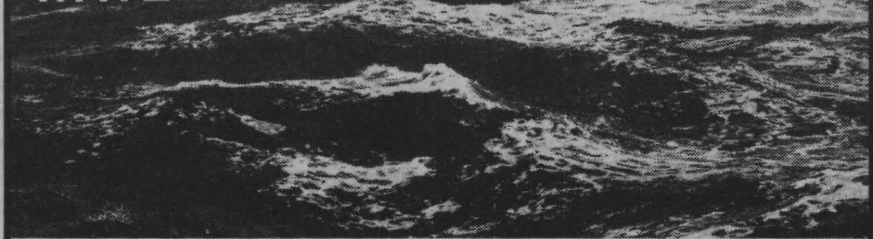
the audience.

Dinner reservations must be made before 10 a.m. Monday. Reservations can be made by calling Charlotte Mergen at 678-2141 or Cindy Guerra, 678-2201. These are local calls from Las Cruces, El Paso and Alamogordo.

All ADPA members and their guests and interested individuals are invited.

The American Defense Preparedness Association is a society of American citizens dedicated to fostering progress in science, engineering, education and management for the national defense.

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6-9 x 12 ft.	Mandaria Orange Sculptured	79.00	43.00
7-9 x 12 ft.	Nile Green Level Loop	91.00	49.00
8-11 x 12 ft.	Gold/Rust Kitchen Print	104.00	69.50
8-1 x 12 ft.	Wood Plank Parquet Print	79.00	47.00
3-1 x 12 ft.	Multi Brown High & Low Loop	21.00	7.95
4-11 x 6 ft.	Sapphire Green Print	28.88	16.50
1-9 x 3-9 ft.	Gold-White Saxony	9.95	2.95
4 x 12 ft.	Glacial Blue Sculptured	53.00	29.95
7-8 x 12 ft.	Gold-Brown Level Loop Tweed	62.00	38.00
6-11 x 3-8 ft.	Morning Sky Green Sculptured	23.00	11.95
18-10 x 12 ft.	Velvet Rust Sculptured	307.00	174.00
8-11 x 12-2 ft.	Caprice Gold/Orange Kitchen Print	104.00	69.50
12-11 x 12 ft.	Kismet Blue Print	210.00	120.00
2-11 x 12 ft.	Apache Beige Saxony Plush	40.00	21.95
6 x 11-9 ft.	Cinnamon Bark Sculptured	69.00	39.50
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12-4 x 12 ft.	Royal Shah Green Kitchen Print	199.00	104.00

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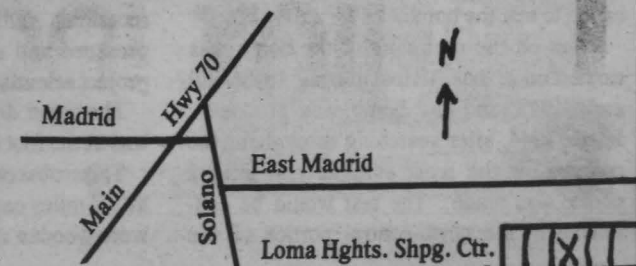
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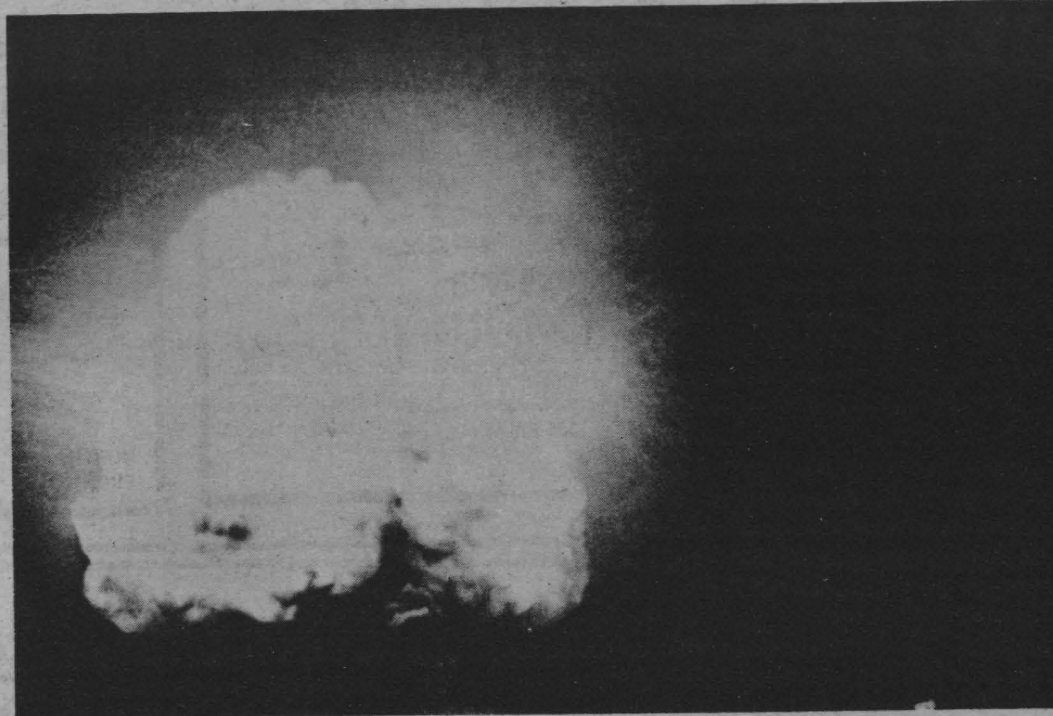
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16 SECONDS—This is one of the famous shots which showed the world it had entered the nuclear age on July 16, 1945. The

explosion was estimated to have a force equal to that of 20,000 tons of TNT.

## Trinity Site gives birth to Atomic Age

Thirty-five years ago (July 16, 1945) an event took place in New Mexico which must rank near the top of any list of events which have shaped the course of the world.

It was on that day at 5:29:45 that the world's first atomic bomb was exploded at Trinity Site on the northern reaches of what is now White Sands Missile Range. Few people would question the effect the bomb has had on political affairs of the world in that 35 years.

The explosion that morning was a result of more than two years of driving, secret and dangerous work at Los Alamos Scientific Laboratory (N.M.) by a force which grew from 250 in July 1943 to 2,500 in July 1945.

So the Army took over some 54,000 acres of land around and containing the Los Alamos Ranch School, selected the University of California to operate the new laboratory, began borrowing sophisticated equipment and assembled a group of some of the finest scientific minds in the world to begin working on the bomb.

Brig. Gen. Leslie R. Groves, the man who had just built the Pentagon, was given overall control of the nuclear project (Code named Manhattan Project). Dr. J. Robert Oppenheimer, a physicist with the University of California, was selected to supervise scientific operations at Los Alamos.

Two major problems had to be conquered: the scientists must design a bomb and instruments for measuring its blast and nuclear effects, and they must find a location to test the bomb.

Work on the designing of the bomb was carried on at Los Alamos during 1943, and early 1945, and the bomb was produced. In late 1944, after searching throughout the country for the most suitable test site, a choice was made. The test would be conducted in the north-central portion of the

old Bombing and Gunnery Range of the Alamogordo Army Air Field know since 1948 as Holloman Air Force Base.

Dr. Oppenheimer promptly dubbed the site Trinity. Today it is known as Trinity Site.

Trinity Site is located on the Jornada del Muerto—Journey of Death—between two mountain ranges about 125 miles north of El Paso. The 432-square-mile piece of desert was and is a place of deadening heat and drought, interspersed with fierce winds and, during July and August, thunderstorms. It was a part of the one week old White Sand Proving Ground, established July 9, 1945.

The site was chosen for safety and secrecy. This was a region of public grazing land that had always been sparsely populated. During World War II it was even more deserted and remote than ever since being withdrawn by the War Department for use as an aerial gunnery and bombing range.

Final preparations for the test explosion began in earnest four days prior to July 16, with an old ranch house situated on the range serving as a site for assembly and tests of the active nuclear material.

The bomb was placed on top of a 100-plus foot steel tower on Saturday, July 14, and installation of the detonators was started.

Meanwhile, other technicians went about installing seismograph and photographic equipment at varying distances from the tower. Other instruments were set up for recording radioactivity, temperature, air pressure and similar data required by the project scientists.

The tower designated Zero. Ground Zero was at the foot of the tower.

Three observation points were established at 5.7 miles each from Ground Zero. These were wooden shelters protected by concrete

and earthen barricades. The observation point lying south of the bomb tower served as a control center. Here Dr. Oppenheimer, head of the Los Alamos Scientific Laboratory, would take his position.

A fourth observation point was at the base camp, 10 miles from Ground Zero, and a fifth one Compagna Hill 20 miles away. Most of the scientists and observers present for the test were stationed at this last point; among them was Dr. Knox Millsaps, later to become chief scientist at the Air Force Missile Development Center at Holloman Air Force Base.

The test was scheduled for 4 a.m. July 16, but rain and lightning early that morning caused it to be postponed until 5:30. The bomb could not be exploded under rainy conditions—rain would increase the danger from radioactive fallout and interfere with observation of the test.

However, the rain stopped about 4 a.m., and at 5:30 the bomb was exploded successfully. In the view of most observers the brilliance of the light from the explosion—watched through dark glasses—overshadowed the shock wave and sound that arrived some seconds later. But the shock did knock down two men at one of the inner observation posts. They had started to get up from the ground, where they had been lying face down with their heads pointing away from the blast site, immediately after seeing the flash of light. Although they were knocked off their feet as the shock wave rolled over the ground, they were not hurt.

Immediately after the test, which greatly exceeded the expectations of most of those present, a lead-lined tank went forth to explore the site with measuring instruments and to scoop up samples of material from the ground.

The tower had virtually disappeared. Only the metal stumps of the tower legs, which had been imbedded in mounds of concrete covered with dirt, remained.

Surrounding the place where the tower had been was a crater about 400 yards in diameter and 15 feet deep. Sand in the crater had been fused by intense heat into a "glasslike solid the color of green jade." This substance was given the name "Trinitite," after the code name of Project Trinity.

Although no information on the test was released until after the atomic bomb had been used as a weapon against the Japanese, people in New Mexico were quite aware that something special had happened early that morning of July 16, 1945. The blinding flash of light, followed by the shock wave from the explosion, made a vivid impression over an area with a radius of at least 160 miles.

Glass windows were shattered 120 miles from the site—in Silver City, New Mexico. Residents of Albuquerque saw the flash on the southern horizon and then, seconds later, felt the tremor created by the shock wave.

In the Belen area south of Albuquerque, a blind girl riding in an automobile at that early-morning hour sensed the explosion and asked in alarm, "What was that?"

That afternoon and the next morning newspapers and wire services carried a story about an explosion of an ammunition magazine containing a considerable amount of high explosives and pyrotechnics. The story was based on a special press release prepared several weeks before the Trinity event and given to the commanding officer of the Alamogordo Army Air Base to issue in case the press became too inquisitive.

● Continued on Page 30

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# Trinity Site open to public annually in Oct.

Continued from Page 28

Trinity Site was encircled with more than a mile of strong chain-link fencing. Signs were posted on the fence, in English and Spanish, warning of the radioactivity. The site, within the boundaries of the newly established White Sands Proving Ground (renamed White Sands Missile Range in 1958), remained off limits to military personnel and closed to the public.

Eight years after the explosion the danger from radioactivity had subsided. In September 1953, a throng, estimated at 600 to 700 persons, attended the first public showing of Trinity Site. A few years later a small group from Tularosa visited the site on an anniversary of the explosion to conduct a religious service and pray for peace.

Similar visits have been made annually in recent years, usually on the first Saturday in October. These visits are sponsored by The Alamogordo Chamber of Commerce through the cooperation of White Sands Army officials.

Trinity Site had been designated a National Historic Landmark by the U.S. Department of the Interior and had been dedicated as such.

The site remains closed to the public except for these visits. It lies within the impact areas or safety zones for missiles fired into the northern part of the range. The pilgrimage will be held on Saturday (Oct. 4) this year.

As an added attraction the remains of Jumbo were moved out of a ditch some distance away from the enclosed site last year. Visitors to the site this year will see Jumbo outside the entrance gate to Trinity Site.

While the area is dotted with instrument and communication stations, Trinity Site itself lies remote and silent. Time and weather have taken their toll during the years since Trinity's day of glory, and today few signs of the historic explosion remain to be seen.

Yet the atomic age, conceived in Chicago and nurtured in a new and secret installation at Los Alamos, New Mexico, literally was born in that brief moment at Trinity Site. Successful in every respect, the test explosion even exceeded the expectations of many of the scientists and technicians who developed the awesome new weapon.

In 1965, Army officials of White Sands Missile Range erected a modest but appropriate monument on Ground Zero. Made of the black lava stone found in the area, this monument serves as a permanent marker for the site and as a reminder of the momentous event that occurred there.

On the monument is a simple inscription: "Trinity Site, Where the World's First Nuclear Device Was Exploded on July 16, 1945."



MOVING UP FRONT—A crew secures the remains of Jumbo for its move to just out side of the entrance gate to Trinity Site.

The move was made last year and will be something new to see for those taking the tour in October.

## SANTA FE NEW MEXICAN

The Oldest Newspaper in the Southwest, Founded in 1849  
SANTA FE, NEW MEXICO, MONDAY, AUGUST 4, 1980

# Los Alamos Secret Disclosed by Truman ATOMIC BOMBS DROP ON JAPAN

### 'Utter Destruction,' Promised in Potsdam Ultimatum, Unleashed; Power Equals 2,000 Superforts

WASHINGTON, Aug. 4 (AP)—The U.S. Army Air Force has revealed the Japanese atomic bomb containing more power than 20,000 tons of TNT. The production of the development was made in a statement by President Truman released by the White House today.



### Deadliest Weapons in World's History Made In Santa Fe Vicinity

Santa Fe learned officially today that it was the birthplace of the atomic bomb. The revelation, announced by the Los Alamos National Laboratory, disclosed that the secret of the development of the atomic bomb was made in the Santa Fe area.



### 4 More Nippon Cities Now Smoldering Ruins

Four more cities in Japan were destroyed by atomic bombs today, according to a report from the U.S. Strategic Bombing Command. The cities are Kokura, Yamaguchi, and two others.

### May Be Tool To End War Seen

Scientists here believe that the atomic bomb may be the tool to end the war in Vietnam. They believe that the bomb's power is so great that it could force the North Vietnamese to negotiate.

### Tomato Juice Off Rationing

Tomato juice is being removed from the list of rationed goods, according to the U.S. Food Administration. This is the first time since the war that a food item has been removed from the list.

### Hi Johnson Dies at 79

Hi Johnson, a prominent Santa Fe businessman, died today at the age of 79. He was a well-known figure in the community and had been involved in many local organizations.

### Now They Can Be Told ALOUD, Those Stories of 'the Hill'

The stories of 'the Hill' are now being told openly. The residents of the area are no longer required to keep their mouths shut about the activities that took place there.

A PAGE FROM THE PAST—After months of secret work, the testing at Trinity Site and use of it against the Japanese the world finally learned of this new power called the atom which would become an important factor in everyday life in the years to follow.

## Latest range statistics out

With a payroll of more than \$78 million during the first half of fiscal year 1980, White Sands Missile Range was one of the largest employers in the area.

Over 60 percent of that payroll, or \$47.4 million, went to the 4,176 civilian employees working for the Army, Navy, Air Force or the National Aeronautics and Space Administration (NASA) at the range. An estimated \$23 million was paid to the 2,313 civilian contractor employees working at the installation. The remaining \$8.2 million went to the 1,337 military personnel assigned to White Sands.

The largest military reservation in the United States, White Sands Missile Range is also billed as "the" largest employer in the area by the Las Cruces Chamber of Commerce. Besides the 7,826 employees working at the 4,000-square-mile range, there were 1,761 dependents of military personnel living on post at the end of the first half of FY80.

In addition to the payroll of \$78.6 million, the missile range and NASA had almost

\$26 million in local area purchases between Oct. 1, 1979 and March 31, 1980. The contracts involved all types of range requirements from custodial services to payments for electric and natural gas service to special electromagnetic interface investigation support.

During the first half of the fiscal year there were 95 different test programs underway at the sprawling range. The Army sponsored 26 programs, the Navy had 25 and the Air Force had 28 programs. The other 16 programs were for NASA, the national range and other users.

The 296 actual missile firings conducted were only a small portion of the 1,794 tests completed on range during the first half of the fiscal year. The tests included bomb drops, aerial gunnery practices, balloon launches, gun tests and computer runs.

From the range opening in July 1945 through March 31, 1980, a total of 32,019 missiles have been fired at White Sands Missile Range.

### The Weather

The weather in the area is expected to be clear and sunny today. High temperatures will be in the 80s and 90s.



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# DAY'S HALLMARK

# CUTS & STYLES OF LORETTO



# Electrical discharges create Lichtenberg tree figures

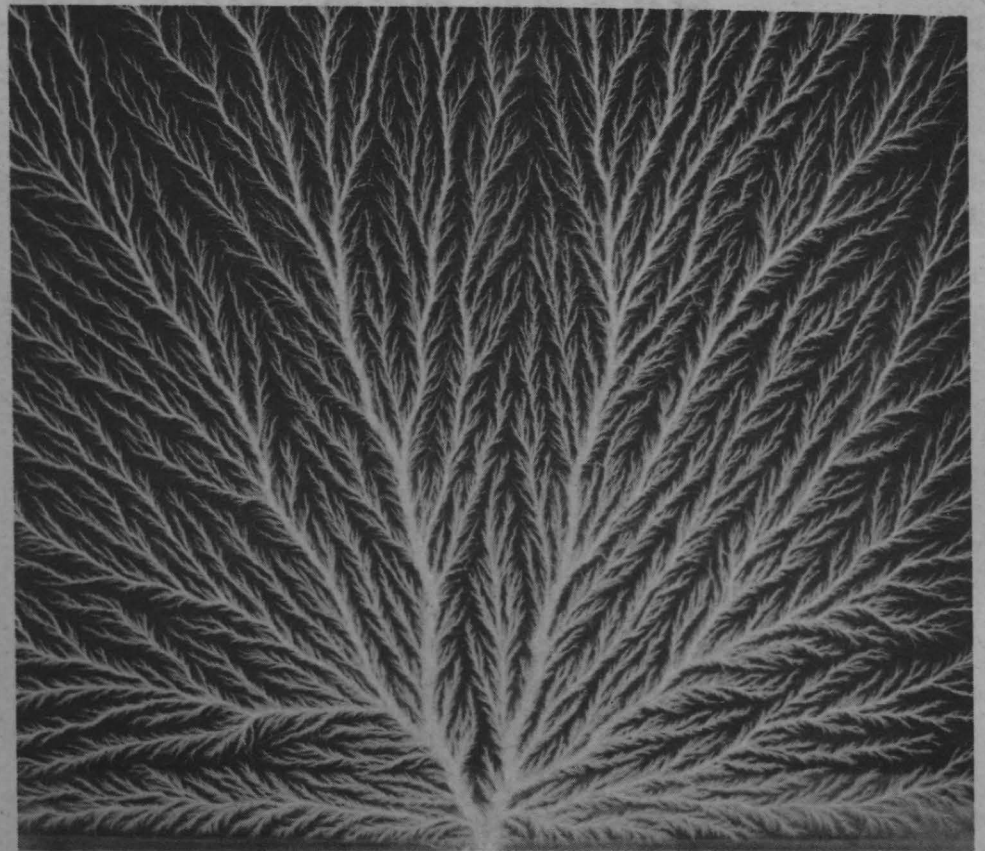
Electrical discharges have always been fascinating. As early as 1775, a German professor of physics at the University of Gottingen, named George Christoph Lichtenberg, conducted a systematic investigation of electrical discharges occurring between an electrode and an insulator.

He found on the dielectric characteristic figured patterns resembling "frozen lightning". These since have become known as Lichtenberg figures.

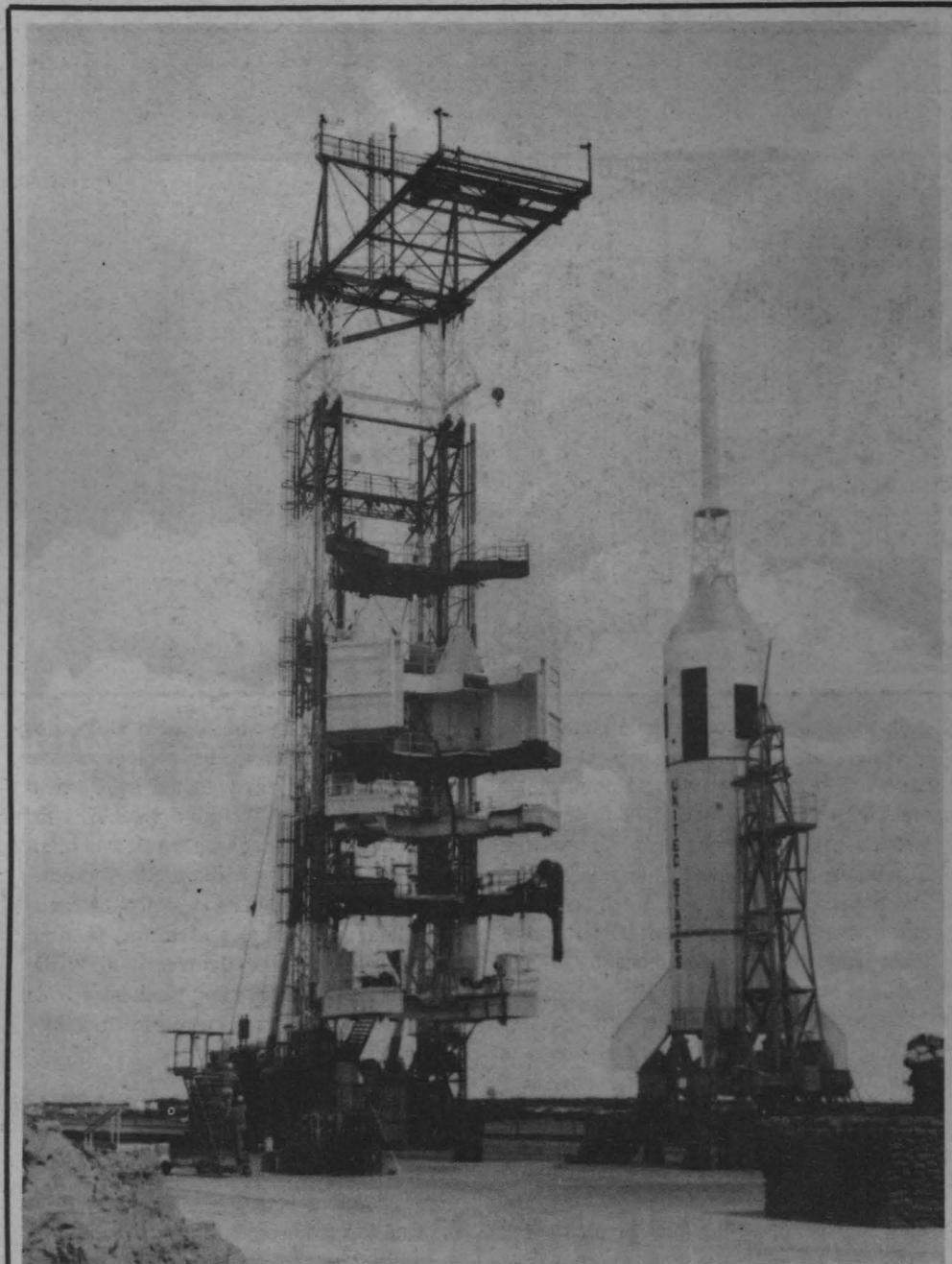
Normally, Lichtenberg figures appear on the surface of an insulator; but if a block of plastic such as lucite or Plexiglas is irradiated with a broad beam of high-energy electrons, a tremendous space charge collects within the volume of the material. Voltages of a few million volts may be built up. As irradiation continues, eventually the dielectric strength of the plastic is exceeded. Then an electrical discharge occurs, by chance, to some external ground accompanied by a loud explosive eruption

and a brilliant flash of light. Multiple paths traversed by the discharge are left as permanent record in the medium. Lines mark where the plastic has been ruptured or punctured by current filaments threading their way to the external grounding point.

This tree was produced by irradiating the block with electrons from the linear accelerator at the White Sands Missile Range. Electrons having an energy of about 3 Mev were directed normally at the flat face of each Plexiglas block. After about a minute of exposure a discharge occurred leaving these Lichtenberg figures. Commonly, the discharge leaps to an edge giving a tree-like pattern, but occasionally it erupts through a face creating a symmetrical display. Probably the primary discharge follows some strain or other dielectric weakness in the plastic. Since these are difficult to detect prior to irradiation, it is hard to predict with certainty where the discharge will strike. Nevertheless, like lightning, the result is always spectacular.



1950



**LITTLE BIG TEST**—The Little Joe II prepares to lift off in a test of the safety tower mounted on its nose as part of the Apollo

Program conducted back in Aug. 28, 1963 at the range's NASA facility. It reached an altitude of 24,000 feet.

The Post Nursery was opened on June 10 by Mrs. T. H. Lewis. It was opened without funds and in July the Woman's Club donated \$75 to keep the facility operating. In September it was necessary for the Woman's Club to take over sponsorship of the nursery.

The Otero County Bank opened its doors on July 20, the first such facility on post. Mrs. C.O. MacGaffick and James Goforth were the tellers.

A deluge of 1.09 inches of rain hit WSPG July 26 to flood sleeping quarters, offices and mess halls ankle deep. Vehicles were stalled by the flood on the El Paso desert road.

"Wind and Sand" went from tabloid size to a seven-column full size paper on Aug. 31.

The new Post Headquarters Building was nearing completion Oct. 3, and was expected to be occupied in mid-November.

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DAVID WILKERSON

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**THE BIBLE**  
SPECIAL MESSAGE

SUNDAY MORNING 11:00 AM  
SPECIAL MESSAGE BY PASTOR PORTUGAL  
**"ISRAEL GOD'S TIMECLOCK"**  
ONE WORD PROVES THE INSPIRATION OF THE BIBLE (THE JEW)

WEDNESDAY EVENING  
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SPECIAL MESSAGE  
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JULY 5<sup>TH</sup>-9<sup>TH</sup>  
SAT.-WED.  
7:30 P.M. NIGHTLY

SUNDAY, 11:00 AM  
**Sound of the Trumpet**  
The Prophecy of Christ's Return in the Context of Everyday Living

TUESDAY, 7:30 PM  
**FUTURE JOURNAL**  
What Does the Future Hold for Mankind?

**Wild frontier**

# Range abounds with secrets of the past

Within White Sands Missile Range boundaries may be found a fusion of the old and new in military defense of a nation, from Indian arrowheads to modern missiles and spacecraft.

The desert sands above which supersonic missiles now fly once knew the tread of Geronimo and his Apache warriors. Spanish explorers came this way from Mexico City, almost 40 years before the Pilgrims landed at Plymouth Rock. Billy the Kid and Sheriff Pat Garrett played cat and mouse, traversing dunes and arroyos during the bloody cattle wars which reached their bitterest climax right here in the Tularosa Basin.

Probably the single most significant event to occur here was the detonation of the world's first atomic bomb. At Trinity Site, 80 miles north of the missile range headquarters, scars of the historic blast are still visible on the desert floor. It was there, on July 16, 1945, that an incredible burst of light bathed the basin and a titanic explosion rocked the world into the atomic age.

The site is closed to the public, but the Alamogordo Chamber of Commerce, through the cooperation of WSMR, sponsors an annual tour to Trinity Site each October. The circle of Trinitite, the green glass formed when the bomb's blast fused the desert sand, has been crumpled, scattered and bulldozed under. Only a lava rock monument with a bronze plaque marks the spot where the nuclear age was born.

U.S. Highway 85, which follows the Rio Grande, is America's oldest road. It follows the original Spanish Camino Real, connecting Mexico City with Santa Fe, N.M. Blazed by Friar Rodriguez in 1581, Camino Real was travelled by Espejo the following year, and then in 1598, Don Juan de Oñate led his colonists over the route to Santa Fe. Eighty-two years later, descendants of Oñate's colonists returned over the route in their tragic flight for their lives when the Pueblos revolted against Spain.

Some historians hold that Cabeza de Vaca, who traveled from Florida to California circa 1536, followed a trail along the Pecos River to just north of Carlsbad, N.M.,

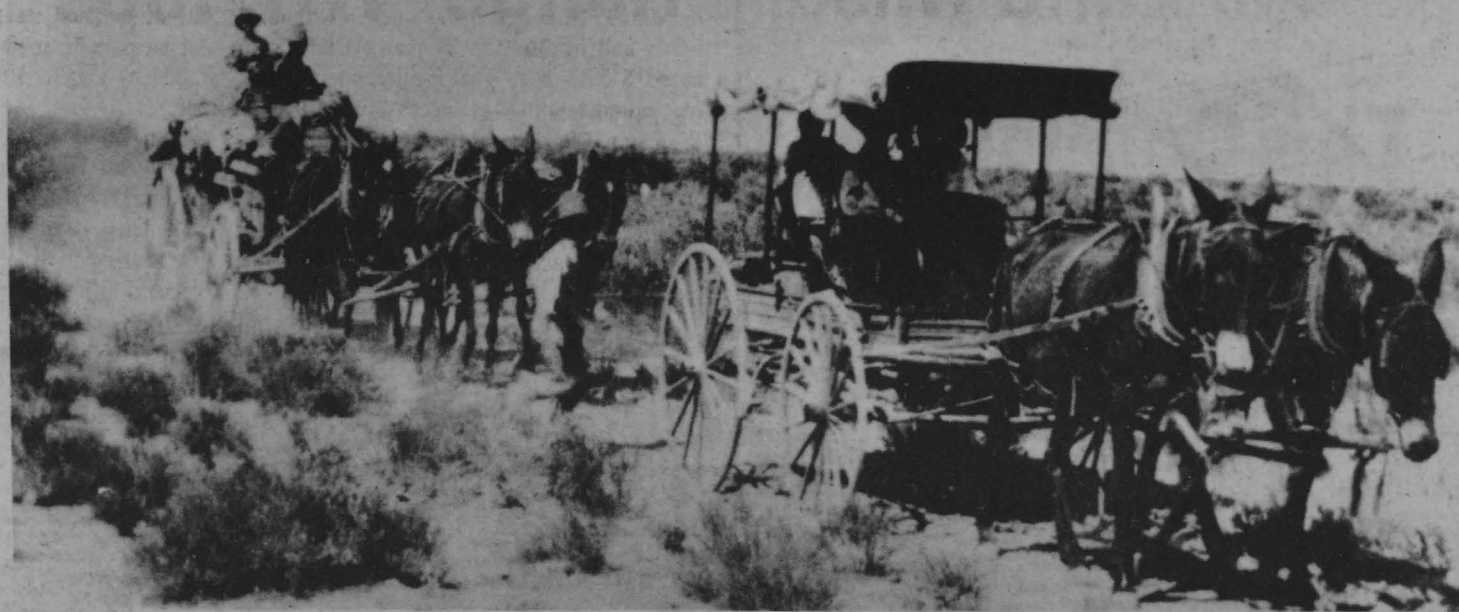
before entering what is now the missile range. His path led north to the Guadalupe Mountains, south of the Sacramentos and then west through Orogrande to where post headquarters is today. Then his route passed over the Organ Mountains at San Augustine Pass and then continued on the west side of the San Andres Mountains into Jornada del Muerto.

The Santa Fe, Butterfield and Chisholm trails wove a new chapter of Southwest history as an expanding nation pushed west and tried to impose a more refined civilization. On the latter trail, which passed Ft. Stanton, near where Carrizozo, N.M. is today, Colonel Christopher (Kit) Carson, with five companies of volunteers, operated against the Mescaleros. The campaign was bolstered with this order from higher headquarters: "Kill all Indian men of the Mescalero tribe wherever you find them." Women and children were spared. The 100-mile radius of Carson's operations took in most of the present missile range.

Geronimo, the Mescalero Apache chief, whose home was this area, and Dog Canyon,

20 miles east of the range, are synonymous with the last of the Indian wars. The Chief was a master of guerrilla tactics and cost the United States \$38-million in attempts to thwart his band of fewer than 100 braves. From peaks surrounding Dog Canyon, Geronimo would observe approaching troops who were hunting him. The troops, tired, and often riding exhausted and shoeless horses, would be lured up the long, narrow and rugged box canyon. Then they were swept to the canyon floor by avalanches of rocks set in motion by the renegade chief and his warriors.

When not confronted with Indians, U.S. soldiers grappled with their Confederate counterparts. Major Isaac Lynde, Union commander, evacuated Ft. Fillmore, a few miles south of Las Cruces, to reach Union lines at Ft. Stanton, and traveled over the San Augustine Pass. His command, without water and struggling for miles to the rear, was surrounded by Colonel John R. Baylor's Mounted Rifles who picked up stragglers without resistance. Lynde's troops were in such disarray that when the



cannons were turned to fire on the Confederates, there was nothing to fire because the ammunition was miles ahead in another part of the column. Outnumbering the aggressor, two-to-one, and holding the high ground, Major Lynde surrendered. While scarcely a shot was fired, the outcome was significant; the Confederacy needed gold to bargain with foreign merchants and now it was assured a large chunk of the mineral-laden Southwest.

The Lincoln County War, involving Billy the Kid and Sheriff Pat Garrett, became a gory conflict when a New Mexico cattle baron tried to drive one Alexander McSween out of the county. The war attracted desperados from all parts of the Southwest, including the infamous Seven Rivers gang that sided with the baron. John H. Tunstall, an Englishman on the side of McSween and a friend of William "Billy the Kid" Bonney, was shot by a posse after surrendering his weapon. Billy the Kid, enraged, sought to right the wrong.

Boldly, the young cowboy inflicted, flirted with and escaped death in each scrape only to be caught eventually, and imprisoned in Mesilla, once the capitol of the New Mexico-Arizona territory. The courthouse in which he was held, tried and sentenced to be hanged, all in 1881, still stands at the corner of the Plaza where the Gadsden Purchase was confirmed in a flag-raising ceremony in 1854. Transferred to Lincoln County for execution, the Kid got away but was pursued and shot to death by Garrett. The Sheriff died violently, too, near Organ in 1908. A man named Brazel, claiming self defense, pleaded guilty to the shooting of Garrett and was acquitted.

For about 150 years, a nearby ranch has figured largely in Tularosa Basin history. The San Augustine Ranch has been refuge for pioneers, fort against Indians, inn of both fine and ill repute, haven for outlaws, scene of duels and one of the most successful cattle ranches. It's three-foot thick

walls and protective patios hold many tales of yesteryear; Jim Cox, the present owner, can point to mines, graves and other memorabilia which tell much about the Tularosa's wild and woolly days. It was the Cox family that moved to the site in 1888 and tamed excesses which drove scores of others away. Later they dealt 90 per cent of their land to the government for White Sands Missile Range.

While the Cox family unwittingly was making the range safe for missilery, a New Englander was making missilery safe for the world. Robert Goddard, the Father of Modern Rocketry, set off the first liquid fuel rocket near Worcester, Mass., in 1926. He set off others and their impact sometimes ignited fires. The Northeast's reatively cramped populace was apprehensive. Charles Lindbergh convinced Goddard to move to the wide open spaces out West where his rockets would be less dangerous. Goddard came to Roswell, east of the range and spent more

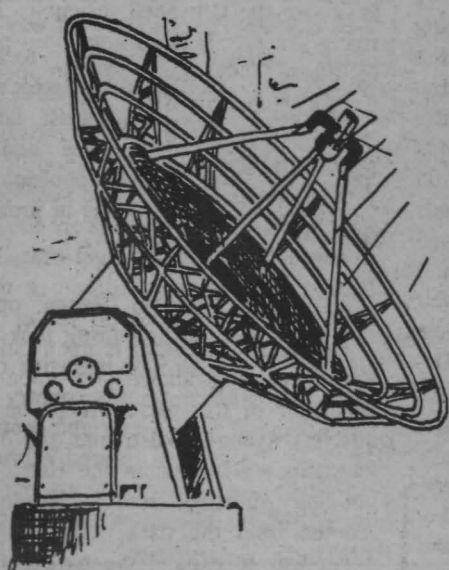
than a decade establishing record after record for altitude. His rockets of the early 30's were largely copied by German scientists in their V-1 and V-2 vehicles for World War II. Though his work was often scoffed, Goddard trailblazed rocketry, especially gyro stabilization, deflector vanes for guidance, principles of thrust, landing devices, multi-stage launches and the mathematical theory for propulsion; his most advanced work occurred in proximity to today's missile range.

White Sands Missile Range opened July 9, 1945 and the first firing took place Sept. 26, 1945. The first intensive rocket program undertaken by this country commenced the following spring and continued until 1951. Sixty-seven captured V-2 rockets were fired; then we developed our own vehicles and the gates to modern missilery, defense and space opened.

# CONTINUED PROGRESS



**For 35 Years We Have Worked As a Team  
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All-Land Missile Range. We Hope  
The Coming Years Will Be As Pleasant  
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The Good Work.**



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# Missile Museum shows history and progress

A silent cluster of objects stands watch over Headquarters at the range. Mysterious monoliths seemingly frozen in time and space, which together form the nation's first outdoor "missile museum."

The park, a triangular shaped area at the intersection of Headquarters and Nike Avenues, was established in 1955. It contains actual examples and models of many of the missiles and rockets tested at the range.

The collection of Army, Navy and Air Force missile and rocket systems is displayed in typical firing attitude and is the focal point of interest of visitors to the range. It is the only place on post where visitors are allowed to take pictures.

The different rockets and missiles exhibited in this unique outdoor museum represent extensive test programs conducted at the desert installation since its establishment some 35 years ago.

The first three missiles that started the park were the German V-2, the American version of the German V-1 (known as the Loon), and the U.S. Army's Nike I, later known as the Nike-Ajax.

Holding center stage in Missile Park is a German V-2, one assembled from carloads of parts brought to the New Mexico missile range from Europe at the end of World War II. The V-2 was built by the Germans from findings of Dr. Robert Goddard, who did pioneer testing during the early 1930's near Roswell, N.M.

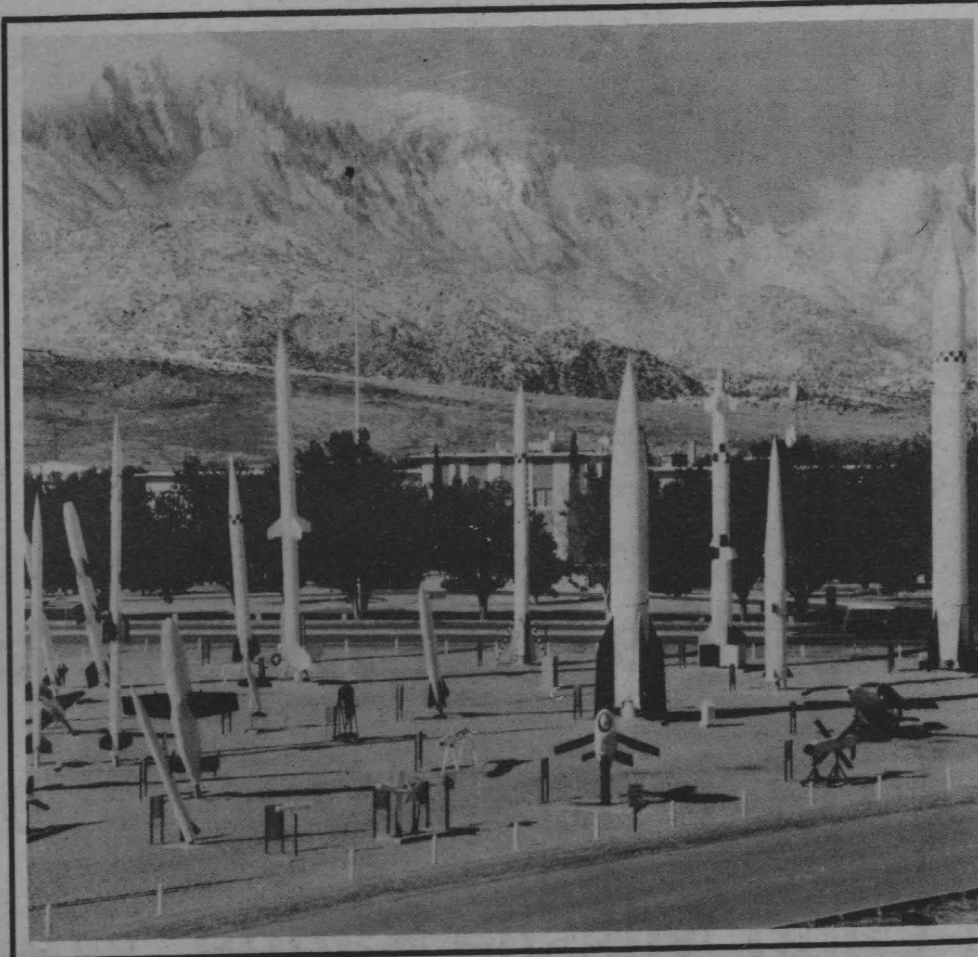
The V-2 experimental program during the early years of WSMR provided the basic research for America's array of modern missiles and rockets and for placing men on the moon less than 25 years later. America's missile program began in earnest on April 16, 1946 when the roar of the first V-2 shattered the desert stillness as it lurched from its make-do launch pad and careened across the sky.

Between then and June 28, 1951, a total of 65 reassembled V-2s were launched on White Sands range and two from ships at sea. During the program, the V-2 was used for hundreds of experiments and set numerous records, chiefly because it was the vehicle for the nation's first missile program. A V-2 with a WAC Corporal mounted on its nose was the world's first two-stage missile. One of these two stage rockets, on Feb. 24, 1949, set an altitude record of 244 miles. That was America's first step towards the moon.

Nike Ajax was America's first guided anti-aircraft missile. It was first tested at WSMR in October 1951 and became fully operational May 30, 1954. It was the world's first supersonic guided missile to become operational and 10 years later, in November 1964, the pen-shaped Ajax which had a "one shot kill" potential was withdrawn from active duty.

Other members of the Nike family in the park are Nike Zeus and Hercules.

Nike Zeus was the U.S.' original anti-ICBM missile system to reach advanced development. It was designed for defense against ICBM's and intermediate range ballistic missiles that could be launched against heavily populated areas, industrial centers and strategic military points.



The Nike Hercules was the U.S.' primary high altitude air defense weapon. The weapon was used successfully against high performance aircraft at a variety of altitudes.

Within a couple of years, a dozen or more missiles had been installed in Missile Park, each donated by the contractor who built and owned it.

Although the V-2, Loon and Nike Ajax were charter members of Missile Park, they were not the first missiles flown on the White Sands range. That honor belongs to a war-time Tiny Tim, modified to simulate a WAC Corporal and developed to probe the upper atmosphere. The Tiny Tim was launched Sept. 26, 1945.

Soon to join the ranks of weapons in the outdoor showcase was the Navy's Aerobee Hi sounding rocket used for upper atmosphere studies. Still a vital support vehicle today, Aerobee was first flown in 1947 and broke its own altitude record for a single-stage boosted rocket 10 years later, on April 10, 1957, when it zoomed to 190 miles. Through the years, Aerobee has kept pace with science and today supports numerous programs including several for the National Aeronautics and Space Administration.

Another making an early debut in the park was the Army Corporal, the tall, slim ballistic missile which preceded the Sergeant. Standing 45 feet tall, Corporal had a range of approximately 75 miles compared to some 400 miles for the Per-

shing. Corporal followed a ballistic trajectory and had a propulsion system that utilized a liquid propellant rocket motor.

In addition to missile history, the WSMR Park-museum serves as a monument to missile progress. During late 1966 and early 1967, four of the United States' newest missile systems were added to the collection. These were the Army's long range Pershing, the Air Force Athena and Navy's Tartar and Terrier fleet air-defense missile.

The two-stage Pershing was first tested at WSMR in August 1963. Today operational in the Western World, the highly mobile Pershing is test fired from sites in southeastern Utah and impacts on the White Sands range some 400 miles away.

The Air Force Athena is one of the most dramatic missiles in the park. Named for the Greek goddess, Athena is a research vehicle to study atmospheric reentry phenomena and not a weapon. During the 1960s the 50 foot tall Athenas were launched in Green River, Utah, and impacted on the WSMR range. On reentry to earth's atmosphere over White Sands after its 400 mile flight, Athena puts on a spectacular show that is visible hundreds of miles. The first Athena was launched in 1964.

The Navy Tartar and Terrier took their places with the Talos in the southwest corner of the park in February 1967. Developed at WSMR by the Naval Ordnance Missile Test Facility (NOMTF), the sister

missiles have been combined to form the Navy's long and medium range Standard missiles. Terrier, a two-stage system, weighs approximately 3,000 pounds and has a 15-mile range. The single-stage Tartar has a 10-mile range.

Claiming the title of the largest missile in the museum is the Army's Redstone which towers above all its cohorts. The 30-ton, 69-foot Redstone was replaced by the Sergeant and Pershing which are more mobile and adaptable as tactical weapons. However, Redstone is still fired in Australia. The liquid-fueled missile is a sister model of the propulsion vehicle that carried Commander Sheppard, U.S. Astronaut, on America's first manned space flight.

The Missile Park's smallest missile, although not the smallest in existence, is the Loki which is still used for research, usually in combination with other missiles. The Loki frame measures 103 inches long and three inches in diameter and it weighs approximately 24 pounds.

Also displayed in Missile Park is a bronze memorial plaque commemorating the visit of the late President John F. Kennedy to the National missile range in June 1963.

Recent additions to the park included an Army Lance artillery (surface-to-surface) missile, an Air Force SAGMI (Surface Attack Guided Missile), an Air Force Hound Dog air-to-ground missile and a NASA "flying saucer."

The Lance, designed to replace the Honest John and Sergeant artillery systems, is the first Army missile to utilize a pre-packaged, liquid propellant. The Lance travels at supersonic speed and has a simplified inertial guidance system.

The SAGMI, produced by the Beech Aircraft Corp. for the Air Force, is 16.7 feet long and a fraction over one foot in diameter. It has a wing span of 3.3 feet. The SAGMI was first fired at the range in April 1972.

The Air Force first tested its Hound Dog air-to-ground missile at White Sands in 1960. In 1964 this large and highly accurate system made history when it was launched from a B-52 bomber in flight over Del Rio, Tex., and guided to impact on the range.

Among the displays in the park is a cone-shaped item known as the Pep Shell. It is said the Pep Shell resembles a small flying saucer. It is an aluminum parafoil, or lifting body, that was dropped from a balloon and impacted on the range in a test conducted by the National Aeronautics and Space Administration.

Other items acquired and soon to make their appearance in the park are the Army's Redhead/Roadrunner target missile, the Army's Cardinal target drone, a mock-up version of NASA's Mars Viking lander.

The missile museum is open daily with limited parking allowed around the perimeter of the park, except on Headquarters Avenue. Restrooms and drinking fountains are located in the Headquarters building directly across Headquarters Avenue from the park. Plans are now under way to expand the park northward toward the Las Cruces gate.

## 1947

Brig. Gen. Philip G. Blackmore assumed command of the Proving Ground on Aug. 4,

1947, and Lt. Col. Harold R. Turner was assigned as Executive Officer.

# Range's Army air mission under goes few changes

● Continued from Page 8

May 1980, AAOD extended their record to 39,000 accident-free hours.

## AAOD today

The original Army air operation spawned at Condron Field in 1942 is alive and well today, having survived oscillating changes in command responsibility, personnel, aircraft, location and workload. Only the mission remains the same.

The Army Air Operations Directorate (AAOD), commanded by Lt. Col. G.G. (Gary) Loban is located in the north area at Holloman Air Force Base. The organization has 17 aircraft and 17 pilots. The times have changed as 15 of these aircraft are rotary wing or helicopters.

There are five Bell UH-1's or Hueys, each of which carry two crew members and 11 passengers. Ten OH-58's, small Bell helicopters, perform most of the missile search missions.

Two fixed wing aircraft include a Beechcraft U-21 Kingair (UTE) and a Beechcraft Queenair U-8. These are similar in configuration with the exception that the U-21 is slightly larger and has twin turbine engines. The U-8 is an older model with twin reciprocal engines.

The UTE U-21A was designed to provide support to ground troops in or out of the combat zones. It is capable of performing aerial photography, geodetic survey, and electronic warfare. It may also be used to deploy paratroops, conduct aeromedical evacuations, and support special Army Security Agency missions. At WSMR, the UTE is used mainly to transport personnel and cargo.

While the mission of search and recovery is still the same, with the advent of navigational equipment in the aircraft, a new capability has been added—tracking. Missiles in flight can be tracked by Army aircraft and the information relayed to stations on the ground.

Pappy Hedrick holds the most tenure as an Army aviation pilot at WSMR. Hedrick sums up the work history of Army Air Operations at WSMR when he says "Most of the time its not the same two days in a row". As an example of the variety of the daily workload he described a mission last year when Army pilots airlifted scabies-ridden bighorn mountain sheep off the range for the State Game & Fish Department.

## Condron field changed too

Meanwhile, under the direct supervision of Army Air Operations Division (AA-O) Chief, Maj. James D. Wyrosdick, Condron Field has only one full time employee, civilian Roy C. Overton. Overton operates the entire field by himself and is physically responsible for all the activities of an operating airport. Overton answers the phone, communicates with flying aircraft in the area, coordinates incoming and outgoing flights, gives takeoff and landing instructions and meteorological information.

Condron Field's solitary inhabitant communicates on four radio frequencies, two of which are for emergency use. He must coordinate his flight activities with "Cherokee Control," Army Air at Holloman. Overton also must stay on top of field maintenance problems and arrange for modifications and repairs. This includes physical properties of the field, the landing lights, housekeeping, fuel—everything.

There are no aircraft based at Condron, other than those belonging to the WSMR Flying Club. Permission must be obtained to use the field. This is also coordinated through Overton who briefs the pilots as to how to approach the field in one of four authorized corridors. The field's normal operating hours are from 8 a.m. to 4 p.m. In the event of aircraft landing at night,



ACE—For Marvin "Pappy" Hedrick, civil service pilot, Army Air Operations Directorate, its work as usual on his 25th anniversary date as a pilot at White Sands

Missile Range. Hedrick, 64, recently received a 25-year pin and recognition for his accomplishments. "Pappy" has no plans for retirement.

Overton sets a timing device to turn the field lights on and off automatically.

Condron Field once logged 16,000 operations a year. A landing or a takeoff are each single operations. Condron is now logging 250 to 300 operations monthly. The field is often used as a base of operations or an "objective" for airborne or cavalry maneuvers. This is possible because Condron now boasts of a 6,125 foot runway which accomodates some of the largest conventional aircraft and medium sized jets.

For example, this month, forces of the 18th Airborne Corps from Ft. Bragg, N.C., will paradrop troops south of Condron,

and maneuver north to "take" the field. Later, all troops will evacuate in C-130 aircraft.

Condron Field's main mission is to support the movement of VIP's and cargo coming to and going from WSMR. Corporate aircraft of contractors using WSMR may also use Condron as a base of operations.

Even with no aircraft and a single airport operator, indications are that Condron Field will be active as long as there is something going on at White Sands Missile Range, N.M.

## A few surprises to come in WSMR's future

● Continued from Page 14

the Sandia Power Tower in Albuquerque and the Barstow Facility, California.

The Physical Sciences Laboratory at New Mexico State University is scheduled to use the solar furnace to conduct solar-chemical process tests. They plan to heat methane gas and/or ammonia with the sun. They hope to retain all the energy in the original fuel, plus add stored solar energy.

## NASA

Northrup Strip, located in the middle of White Sands Missile Range, has been tasked by NASA to support the first six flights of the space shuttle.

Located on the edge of White Sands National Monument, Northrup Strip has been used by the national range as a landing site for drones, or target aircraft. NASA

named the area the alternate end-of-mission landing site for the first six shuttle flights. The first launch is now scheduled for late this year or early next year. The following flights are programmed at four to five month intervals.

Construction of runways at Northrup continues. The existing north-south runway was extended to 35,000 feet and an east-west runway of the same length was graded. Hardening and smoothing procedures continue.

NASA officials say construction of a derrick has begun at Northrup Strip. The derrick will be used both to deservice the shuttle if it lands at WSMR and to mate it to a 747 for the return to Cape Canaveral.

The space shuttle rendezvous radar system is programmed to be tested at the national range for one year beginning in

June 1981. The radar system, though being tested on the ground, will be used on the space shuttle to aid in connecting with payloads or other spacecraft.

## Future weapons

For 35 years White Sands Missile Range has had the mission of testing rocket and missile systems before they were accepted into the Army inventory. Systems are tested to insure they work as they are designed to, the soldier can use and maintain them properly and that they are the most cost effective model available.

A few of the new systems which have been tested at White Sands but are not yet in the Army inventory include: the XM-1, the Army's newest battle tank; the Patriot surface-to-air defense system; the Stinger,

a shoulder-launched air defense system; The Copperhead, a surface-to-surface artillery projectile; and the Multiple Launch Rocket System.

Just 15 years ago it would have been impossible to predict these types of systems, it is impossible to predict the types of weapons systems which will be tested at the national range in the future, officials report.

Long-range planners say to add distance, speed, greater precision and more power to systems currently being tested. That's for the near future. For more than five years from now, the same planners add weapons hurling bolts of energy across space at the speed of light.

These systems, and systems as yet unconceived, are coming. When they do they will have to be carefully tested. White Sands Missile Range will be ready.

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### STATEMENT OF CONDITION

	JUNE 20, 1979	JUNE 20, 1980
<b>ASSETS</b>		
First Mortgage Loans	\$ 60,148,113	\$ 63,634,799
Home Improvements and Mobile Home Loans	1,256,287	1,115,696
Loans on Savings Accounts	2,054,743	3,809,100
Real Estate Sold on Contract	86,095	81,668
Real Estate Owned	37,460	49,045
Investment Securities	11,590,924	12,397,203
Federal Home Loan Bank Stock	540,800	560,400
Cash on Hand and in Banks	303,728	422,185
Office Building and Equipment	1,336,140	1,313,257
Other Assets	229,027	226,455
<b>TOTAL ASSETS</b>	<b>\$ 77,583,317</b>	<b>\$ 83,609,808</b>
<b>LIABILITIES</b>		
Savings Accounts and Certificates of Deposit	\$ 69,013,821	\$ 74,336,404
Notes Payable-Borrowed Money	2,000,000	2,000,000
Advance Payments by Borrowers for Taxes and Insurance	756,051	812,053
Other Liabilities	731,364	900,755
Deferred Income	451,923	478,462
Specific Reserves	915,633	1,361,192
Reserve for Losses and Undivided Earnings	3,714,525	3,720,942
<b>TOTAL LIABILITIES</b>	<b>\$ 77,583,317</b>	<b>\$ 83,609,808</b>

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# OTEF vans assist in testing at range

The Office of the Test Director, Joint Services Electro-Optical Guided Weapons Countermeasures Test Program at White Sands Missile Range has accepted delivery of a new Operational Test and Evaluation Facility. It is designed for field testing and evaluating present and future electro-optical guided weapons systems.

The modern and highly sophisticated system, built into seven mobile vans, was constructed by New Mexico State University's Physical Science Laboratory (PSL) under a \$5.4 million contract. The contract, let Feb. 15, 1979, was the largest competitive contract ever awarded to PSL.

Officials at PSL said several hundred persons, including students involved in work-study programs, were engaged in project development and project support, as well as direct labor. More than 76 man-years of labor were involved in the project, NMSU officials estimated.

J. Craig Erickson, PSL Project Manager, said more than \$3.3 million of the material and supplies for the test facility were procured from businesses in Las Cruces, El Paso and Albuquerque. Science Applications Incorporated received \$232,000 for technical support in video, electro-optical and meteorological areas.

The seven Operational Test and Evaluation Facility (OTEF) vans are designed for world-wide operation under varied operations and storage environments. Since they are self-contained, with their own power source, the vans require little logistical support from host test areas.

Each of the seven vans has a specific function in electro-optical testing. In addition to the control van, there are video, sensor, source, countermeasures, telemetry and characterization vans. Each van is equipped with special electronic devices to perform its particular test role.

Each van has individual computer automated measurement and control (CAMAC) electronics to permit local in-van control as well as complete remote control. Within the control van, two operators can conduct an operation using a special control console with color and black and white television images and CAMAC touch panels. Operational coordination is effected through the use of six VHF ground-to-ground radios, two UHF ground-to-air radios, eight microwave stations and extensive voice networks within each van.

Dennis D. Kasperek of Las Cruces, who is director of the Joint Services Electro-Optical Guided Weapons Countermeasures Test Program, said the new OTEF is an extremely sophisticated, highly automated, mobile, field test and evaluation facility. It will allow his organization to conduct more frequent and more complex developmental and operational countermeasures and counter-countermeasures field testing of increasingly sophisticated electro-optical guided weapons systems.

"This (new OTEF) will augment our old Mobile Instrumentation Facility and allow us to keep current with the rapidly advancing technology in electro-optical guided weapons. This is a bold new facility con-



**TEST UNITS ARRIVE**—The newest test apparatus to arrive at White Sands Missile Range is this mobile Operation Test and Evaluation Facility shown passing past Missile Park and Post Headquarters. The seven mobile units are designed for world-

wide operation for field testing and evaluating present and future electro-optical guided weapons systems. Maj. Gen. Duard D. Ball, WSMR commander, officially accepted the new test vans during brief ceremonies Saturday morning.

ceived to allow testing of the new weapons systems of the 1980s and 1990s," Kasperek said.

Saturday morning at White Sands Missile Range, Maj. Gen. Duard D. Ball, Range Commander, snipped the traditional ribbon officially accepting the seven new test vans

on the national range.

Immediately following the acceptance ceremony the vans were opened to visitors from New Mexico State University, White Sands officials and scientists, and a sprinkling of local news representatives.

## Range illustrator receives special recognition



**ILLUSTRATOR CITED**—Betty Kearney, a technical illustrator at White Sands Missile Range, accepts a certificate of recognition from Maj. Gen. Duard D. Ball, range commander. Ball presented the certificate on behalf of Gen. John R. Guthrie, commander of the U.S. Army Materiel

Development and Readiness Command. Kearney, who has a severe hearing impairment, was cited for her attitude, knowledge of color concept, technical competence and professionalism in all artwork.

(Photo by Frank Ontiveros)

Illustrators often prove the old Chinese proverb that "one picture is worth more than 10,000 words" to be true.

Betty Kearney, a technical illustrator for National Range Operations Directorate at White Sands Missile Range, is a case in point.

When she was 18 months old she had a severe case of whooping cough which left her hearing severely impaired. After two years in the public school system in Alamogordo, N.M., a neighbor told Kearney's mother about the Santa Fe School for the Deaf.

Through an interpreter Kearney explained that her parents' decision to send her to the special school in Santa Fe was a difficult one.

"At first my mother didn't want to send me because she thought I would think they were sending me away because they didn't love me," she said. "But I ended up at the school for the deaf and I am very thankful I went there."

Kearney first became interested in art when she was small. She said she loved to sit and watch "an old man who painted designs." When she arrived at school in Santa Fe and instructors asked what she was interested in, she told them art.

"The first year I was there (third grade) I

won first prize for a drawing of my interpretation of a clown," she said. While attending the school she worked at the Museum of New Mexico.

After Kearney graduated from the Santa Fe School for the Deaf in 1967 she returned to Alamogordo and started working at the missile range as a trainee in technical illustration. Today she is responsible for preparing all visual aids for VIP briefings at the range.

Kearney was recently cited by Gen. John R. Guthrie, commander of the U.S. Army Materiel Development and Readiness Command, Alexandria, Va. She was recognized for "her helpful attitude to get any job done and her knowledge of color concept, (which) assists the senior animators in displaying technical competence and professionalism in all artwork."

Her co-workers say Kearney's hearing impairment is no handicap in her work. Besides being willing to improve her own artistic skills, she experiments with different art techniques to find short cuts which allow illustrators in her section to meet short deadlines.

And White Sands Missile Range has recognized her competence and dedication. Earlier this year Betty Kearney of Alamogordo was promoted from GS-7 to GS-9.

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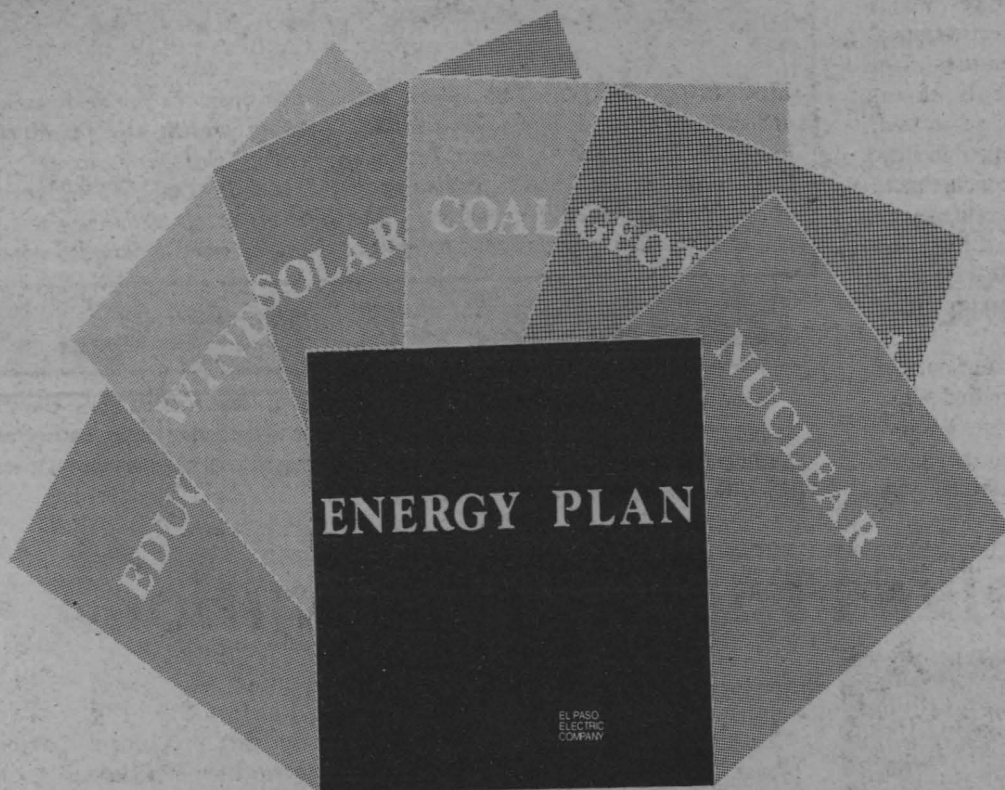
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Skeptics said it couldn't be done. To build and maintain a successful attraction in a remote city in southern New Mexico seemed too good to be true. "Who," they asked, "would come to see it?"

In the three and half years since the International Space Hall of Fame opened in Alamogordo, the question has become largely rhetorical. Averaging approximately 6,500 visitors per month, the Space Hall has a total attendance figure of 300,000 and is currently the only State operated attraction New Mexico to show a 20 percent increase in attendance and revenue for a consecutive period of 20 months. During May of 1980, individuals or groups from Australia, Saudi Arabia, Canada, France, Great Britain, Japan, Mexico, and Switzerland all toured the Space Hall of Fame. Tour groups were running a hefty percentage above those of last year, as were figures for out of state travelers. As the summer months approach, attendance is expected to double.

Skeptics aside, it is somewhat surprising that despite a nationwide slump in the tourist industry, the Space Hall continues to flourish. With gasoline prices increasing almost daily, it would seem likely that a facility located a good 80 miles from a large population center might be one of the first attractions to suffer from the imposing economic crunch. And yet, the figures are proving differently.

Perhaps the best explanation for the Space Hall's success should be attributed to the facility itself. It is an excellent product. The story of space travel and exploration holds a special fascination for people of all ages and nationalities. Space is topical. There is always something new to be learned and the Space Hall presents this information in a manner that is enjoyable for the entire family.

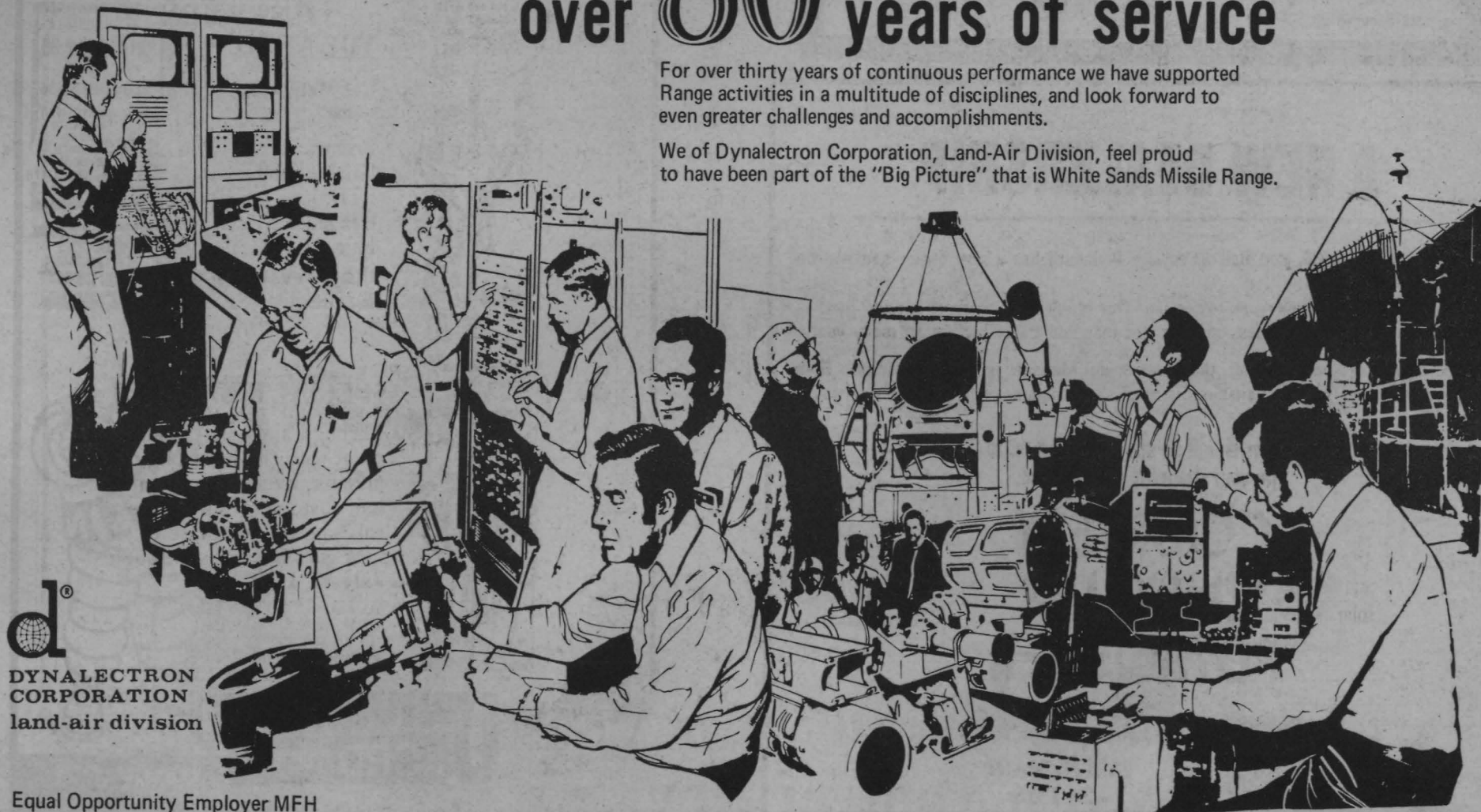
For a nominal entry fee, visitors to the Space Hall can spend from an hour to a day touring the facility and its grounds. Amid rockets, satellites, and capsules, people can view lunar rocks and soil, examine the material of a space suit, sample the taste of space ice cream, or inspect the control panel of an Apollo capsule. A variety of films dealing with the past, present and future aspects of space travel are shown daily in the Space Hall theatre. And, as an added insight to the development of space technology, the Hall of Fame pays tribute to the individuals whose contributions helped make space travel a reality. Representing twelve nations and spanning three centuries, the Hall of Fame inductees share a basic common denominator: a belief in, and influence on, the future of space exploration. It is the presentation of their life stories that help to make the International Space Hall of Fame something worth traveling a few miles to see.



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Legal work in all fields at  
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\*Fees for uncontested  
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on your

## 35th Anniversary



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15% OFF ALL WHEELS

Tax, mounting, balancing, lug nuts, steel covers extra.

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4 for \$888  
4 for \$999  
plus F.E.T.

Sizes A78-13, B78-13, 560x15, 695x14  
Other sizes comparably priced.

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SAVE 24%  
OFF  
RADIALS

SIZE	MSRP	SEMPERT LIST PRICE	MSRP PRICE	SAVE	FEET	TOTAL PRICE
145SR-10	41.89	31.89	31.89	10.00	1.08	32.97
155SR-12	48.76	37.19	37.19	11.57	1.38	38.57
145SR-13	44.96	34.29	34.29	10.67	1.32	35.61
155SR-13	50.04	37.86	37.86	12.18	1.47	39.33
165SR-13	52.06	39.75	39.75	12.31	1.61	41.36
175SR-13	55.65	42.98	42.98	12.67	1.83	44.81
145SR-14	47.74	36.39	36.39	11.35	1.39	37.78
155SR-14	51.30	39.17	39.17	12.13	1.54	40.71
165SR-14	55.88	42.86	42.86	13.02	1.69	44.55
175SR-14	59.42	46.44	46.44	13.98	1.91	48.35
185SR-14	63.04	49.84	49.84	14.20	2.09	51.93
155SR-15	55.88	42.86	42.86	13.02	1.63	44.49
165SR-15	59.42	46.44	46.44	13.98	1.78	48.22

INSPECTED  
TRADE-INS  
Starting at \$999  
Plus Tax

SAVE

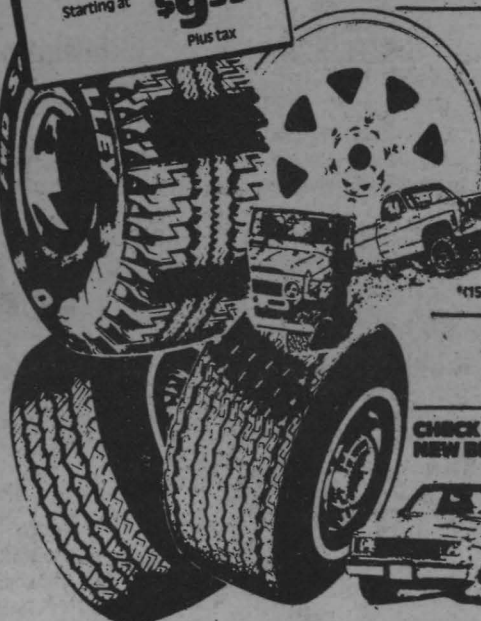
A NEW BIG O SUN VALLEY FOUR-WHEEL  
DRIVE tire and an APPLIANCE WHITE  
SPOKE wheel, only

\$99<sup>95</sup>

Each, plus F.E.T. on the tire and lug nuts, caps & tax on the wheel\*  
Size K70-15 tire & 15x7 wheel 4-Ply Polyester tire  
\*15% Off on Wheels does not apply to this tire/wheel combination.

20% OFF HEAVY DUTY SHOCKS...  
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CHECK OUR SPECIAL PRICES AND WARRANTY ON  
NEW BIG O PASSENGER TIRES!



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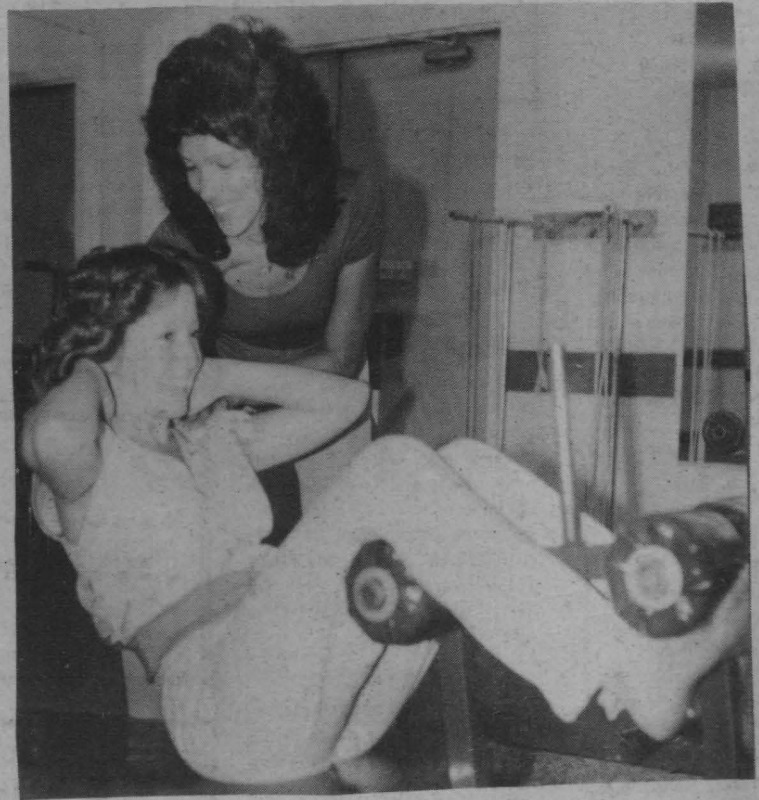
1330 EL PASEO  
LAS CRUCES  
Tel: 524-3548

# We Salute

## ALL WSMR PERSONNEL ON THE 35th ANNIVERSARY OF THE RANGE!



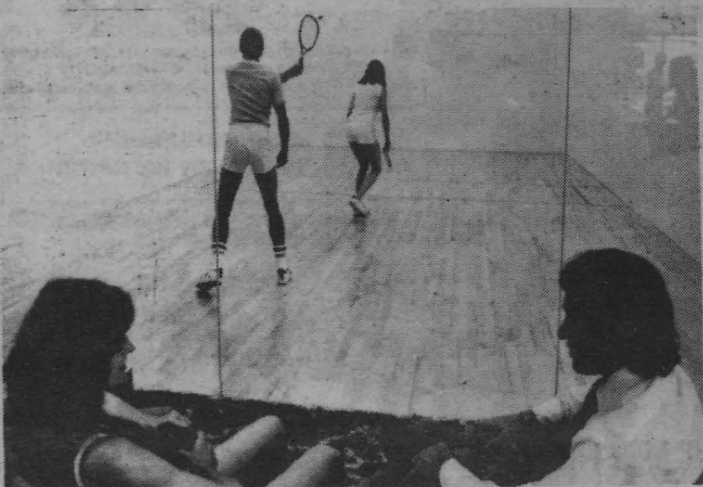
THE STAFF—First row, Tom Young, Connie Young, Tom Young Jr., Sam Serrano; second row, Glenda Young, Vinnie Aragona, Sharon Young, Mary Aragona, Kathy Lauterbach.



Sam and Sharon doing exercises



Kurt, Glenda and Glen are enjoying the relaxing whirlpool



Stay cool playing racquetball!

### SPECIAL CORPORATE RATES

# ALL WSMR

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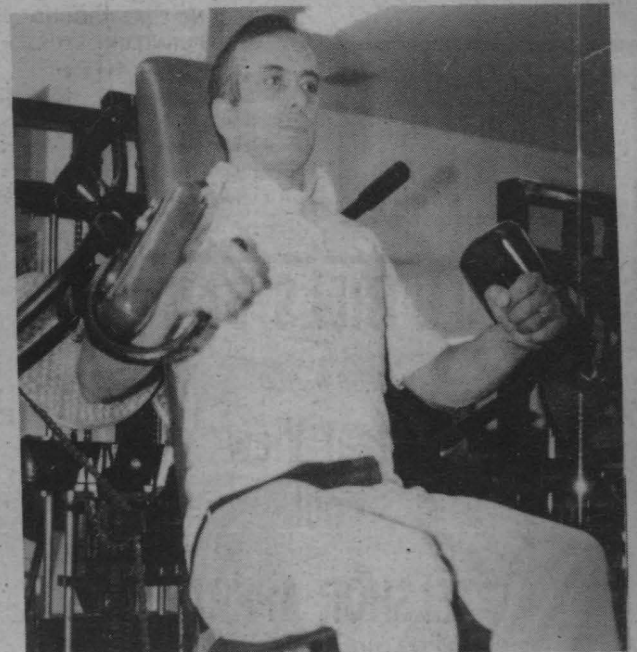
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