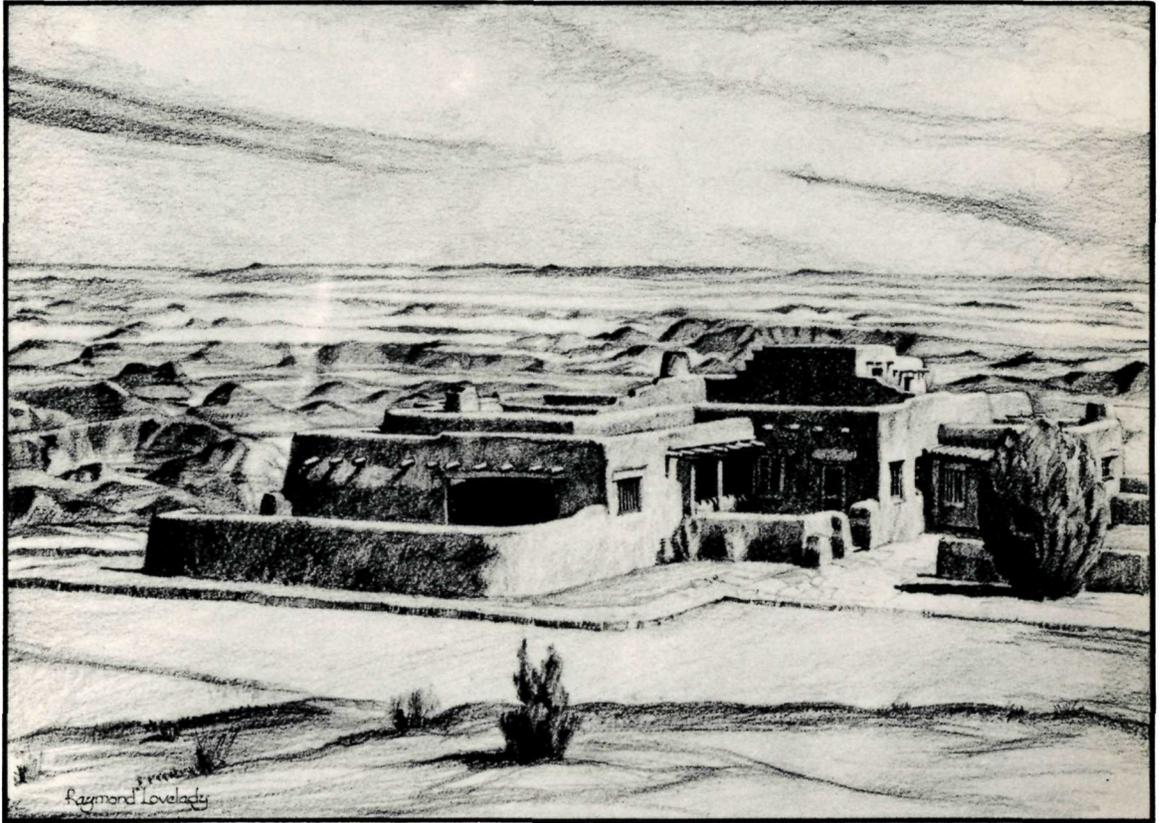


REGION III QUARTERLY



NATIONAL PARK SERVICE

VOL 3 NO 1

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THE COVER

Painted Desert Inn. Petrified
Forest National Monument, Arizona.
- Built by Civilian Conservation Corps
Enrollees

C O N T E N T S

BLACK WIDOW SPIDERS By M. V. Walker	Page 3
FORTUNES PETRIFIED By Howard R. Stagner	Page 8
THE BIG BEND OF TEXAS By Dr. Ross A. Maxwell	Page 11
ANIMAL FAIR By Paul and Greta Ezell	Page 19
AMERICAN ARCHAEOLOGY By Erik K. Reed	Page 23
THE SPOTTED NIGHT SNAKE By Russell K. Grater	Page 28
THE SOUTHWEST By Dr. Aubrey Neasham	Page 29
A DIVINE PLAN FOR REST AND RECREATION By Chaplain Morris U. Lively	Page 36
STATUS QUO OF QUINTUS QUAIL By Earl Jackson	Page 39

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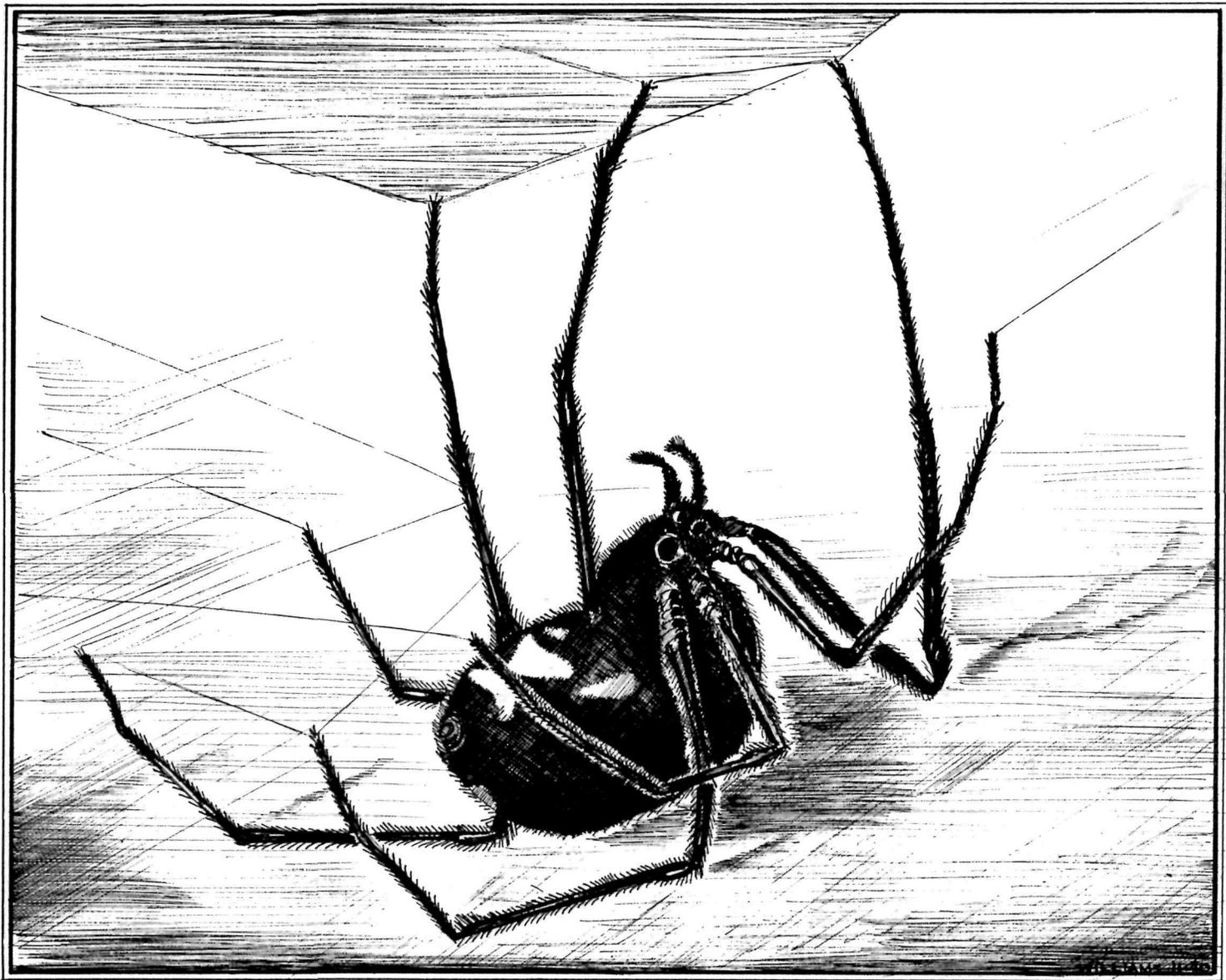
Santa Fe

New Mexico

January, 1941

R E G I O N III

ARIZONA - ARKANSAS - NEW MEXICO - OKLAHOMA
TEXAS - UTAH - AND SOUTHERN PARTS
OF COLORADO AND NEVADA



FEMALE BLACK WIDOW
(ENLARGED)

BLACK WIDOW SPIDERS

By M. V. Walker,
Associate Park Naturalist,
Crater Lake National Park.

It was not difficult for the biologically minded observer to see that Mrs. Latrodectus had not long been a widow, for there was every indication that there was to be an increase in her family. Father was not to be present for the blessed event, for he had been taken for a bit of nourishment in a time of famine, and had passed quietly from the household. He would not be missed, for once a female Black Widow Spider is fertilized she is fertilized for life, and need never mate again. The males are devoured simply for their food value in case of famine, and not because the female prefers to be a widow.

Mrs. Latrodectus survived this depression period, and again good times loomed ahead. Food became more abundant and her girth increased until she was barely able to be about; in fact, there were times when she made the mistake of climbing down to the lower portion of her web-dwelling, and it was only with great effort that she was able to regain her seat at the top of the stairs, where she preferred to reside, sore and proud as a queen. Finally the great day arrived. She fashioned a cover for the nest, fastening it securely by strong but delicate hangers. Under this protecting roof she proceeded to deposit a large number of white, glossy eggs. She wrapped them in a delicate white blanket, and tied it all securely to the cover of the nest. The main event was over, so she retreated a short distance--viewed the incubator with some concern, and then settled down to wait and watch for results.

Mrs. Latrodectus continued to wait and watch, and eat; and a second time it became necessary to fashion a nest, and into this were deposited more white and glossy eggs, to be wrapped in a white blanket and tied securely by strong threads of silky white. Again Mrs. Latrodectus viewed the nest at some distance and retreated to wait and watch. As before, waiting and watching was interspersed with periods of feasting, and before long it was necessary to fashion a third nest, then a fourth. But Mrs. Latrodectus was not discouraged. She began to show quite an interest in the first pear-shaped nest that had been fashioned some days ago. Although it remained white on the outside, the entire center of the structure was getting dark. The quivering of the hammock indicated that there was some sort of movement within the nest. The next few days were filled with expectancy, and finally, if one had been watching carefully, he would have seen that a tiny opening was made near the top of the nest, and there followed a single file procession. One by one they came through this tiny pin hole, until the entire enclosure which was the home of Mrs. Latrodectus, was a wriggling mass of gray and striped bodies, about 150 of them.

Although Mrs. Latrodectus had constructed a number of fine strands for moving around within the enclosure, it seemed that the little Latrodectuses were very proud of their ability to make strong threads of their own over which they might explore this new world. It was not long until the entire place was a mass of tiny threads, for the spiders' activities were confined solely to the interior of a specimen fish bowl. It was on May 15, 1939, that Mrs. Latrodectus was captured and placed in the jar for observation, and it was on June 2, 1939, that she fashioned the first nest and filled it with eggs. The second nest was made on June 9, the third on June 18, and the fourth on June 28. On June 30, the first young emerged.

The family had now increased to such size that it was something of a problem to supply sufficient food. The main diet of Mrs. Latrodectus consisted of crickets, grasshoppers, flies, moths, and butterflies. She was rather cautious in all her actions, and although she must have been extremely hungry on numerous occasions, she always went through a definite procedure in preparing her victim for his demise. When a cricket was dropped into the jar it would be placed in the small fish bowl that formed the bottom half of the apartment. Mrs. Latrodectus seemed to prefer to live upstairs, for she was usually to be seen hanging upside down near the top of the specimen jar, exposing the red hour-glass design on her abdomen. The cricket would soon become entangled in the strong webs that were scattered throughout the bottom jar, and would kick and jump in an attempt to free himself. The shaking of the web network seemed to be the first signal to Mrs. Latrodectus that a foreigner was making an approach, and she would immediately start searching through the maze of threads for the object that was causing the disturbance. She moved quickly but cautiously, and soon approached the intruder. She seemed always to size up the situation for a brief second; plan her attack, then turn about face--and the battle was on.

Although Mrs. Latrodectus is credited with a most virulent type of poison, (one drop is equal to twenty drops of rattlesnake venom) she preferred to do her fighting in a hit-and-run manner. First she started throwing webs about the long hind legs of the invader. She went at this with a vengeance, for the white frothy material from her spinnerets shot out in little droplets, and her long hind legs moved so rapidly that they could hardly be seen. It was only a matter of seconds until the strong hind legs of the cricket were enmeshed with dozens of strands of web, and the more he kicked, the tighter became the hobble. If the cricket became motionless for a few seconds, Mrs. Latrodectus would cease her warfare and retreat a short distance and turn around and look the situation over, but the slightest movement by the victim was the signal for a right about face and another bombardment of sticky threads.

This was continued until the cricket was tied up in such a manner that he could hardly move; at least his movements were so restricted

that Mrs. Latrodectus felt safe in approaching closer, and this she did with caution. She moved slowly and deliberately toward the victim; then with the suddenness of a bullet she opened her tiny jaws and sank her fangs into the big joint of the hind leg of the cricket, and then just as quickly retreated. This was usually the signal for violent struggling by the cricket, who was not completely exhausted but just resting. This would bring forth another attack of web throwing by Mrs. Latrodectus, until no movement could be detected, at which time she would again approach very cautiously and perhaps selecting the other large hind leg of the victim, again sink her fangs into the big joint. This would be repeated until Mrs. Latrodectus was quite sure the victim was securely tied, and perhaps partly paralyzed; at least there was little chance for the cricket to do any fighting.

Then Mrs. Latrodectus did a rather strange thing. Her food supply was securely tied, but apparently she preferred to do her feasting upstairs, for she started pulling or hoisting the cricket up and up into the jar. She tied a big thread to a portion of the cricket and then with her long hind legs holding the thread, she climbed toward the top of the jar, pulling and tugging. Whenever she was able to hoist the victim a bit she tied the thread securely and went down to attach another hoist. This she repeated for minutes at a time, until finally the victim was tied securely near the top of the upper jar.

Mrs. Latrodectus was at last ready for her meal. There were evidently certain portions of the cricket which were considered delicacies, for she attached her mouth parts to the upper part of the head of the cricket, there to remain for hours at a time, evidently sucking the body juices from the victim. Nor was she to be deprived of her meal for just any little disturbance, for one night shake the jar violently, causing her to sway from side to side, yet she would cling with tenacity to the head of the cricket. After all the food was taken from the head, she then drained the food from the body of the cricket, leaving him as only a skeleton. Finally she cut the threads holding him up in the jar, letting him drop to the bottom.

When all the little Latrodectuses came into the world, her feeding habits were a bit changed, for as soon as she had secured her victim and had him neatly tied in the middle of the jar and started to feed on his delicious head parts, the little Latrodectuses proceeded to line up on the big femur and other body parts and try to get their share of nourishment. By the time Mrs. Latrodectus had got around to the less desirable portions, they had been completely drained. The youngsters grew so rapidly and soon developed such appetites that they turned from cricket femurs to more palatable morsels, their less fortunate brothers and sisters. The family was thereby quickly reduced in numbers, and it was but a few days until only 10 or 12 of the stronger were the sole reminders of a once happy family of 125 to 150.

Mrs. Latrodectus had not spent all her time feeding on cricket heads, but had continued to fashion nests and deposit eggs. By July 27,

she had deposited eight cases in the jar and the first four had hatched, but of the approximately 500 young that had been brought forth, most were devoured by their more voracious brothers and sisters. From the first group several young females were beginning to show signs of growing up. There was no question but that the quarters were too confining, so Mrs. Latrodectus and her last four egg cases were transferred to a new apartment. After five more egg cases had been added to this jar, quarters again became crowded and she was transferred for the third time to a new apartment where she at once set about fashioning egg cases until four more had been produced, making in all a total of fourteen of these pear-shaped white hammocks of silky web.

Although Mrs. Latrodectus was kept busy with her own apartment, she often took time to glance back at the first place she had called home. It was then that she nearly burst with pride, for she could see that two of her daughters were nearly as large as she. They had lost their gray, striped, and spotted dresses, and had now put on fine black silky dresses with only the hour-glass design of brilliant red on the front. She could also see that several of the smaller ones had developed large bulbous knobs on the front of their heads. These knobs stuck out as if on short poles. These offspring she recognized as sons now quickly reaching their maturity.

But one day her heart was saddened when she chanced to glance over toward the first apartment, for there was only one daughter to be seen. This daughter had grown enormously during the past few days, and there now remained in the jar this one large female with two or three adult males, and a few tiny dwarfs who were, apparently, not worth while even catching for food. It was only a few mornings later that Mrs. Latrodectus took occasion to glance over toward the first home, and it was then that she was shocked beyond description, for hanging near the top of the old apartment was a pear-shaped nest with a proud new mother guarding it zealously. Mrs. Latrodectus just had to take time out from her morning work to recall the events of the past few weeks. It was just fifty days ago that this daughter had entered the world. Things were certainly moving along, and one could never quite tell what the next day would bring. Just twenty-five days later old Mrs. Latrodectus was again surprised when she chanced to glance toward the first apartment, for there she saw just dozens of little Latrodectuses clambering over the place. The thought suddenly struck her, why, she was a grandmother, and all in the course of a mere seventy-five days.

The summer and fall had passed, and winter was approaching. As cooler weather set in, the Latrodectuses became less active, and would often hang for days at a time upside down near the top of the apartment. The young in apartment two continued to grow and become mature, and the young in the apartment with old Mrs. Latrodectus also became quite as large as their mother, and perhaps, considerably more virile, for on November 8, the observer's heart missed a beat when he saw that Old Mrs. Latrodectus had been securely tied up during the night by one of

her own daughters. It was thus that a grand and glorious old lady passed from the world of the Latrodectuses.

There was no question however, but that the family was to carry on, for some of the children of young Mrs. Latrodectus had grown very rapidly, and there was now observed a number of developing females and males. Young Mrs. Latrodectus was moved to a new apartment, for during the late summer she had deposited three more cases of eggs, and this made the place a bit crowded. It was also realized that even young Mrs. Latrodectus might some night fall victim to one of the more active youngsters. Nothing of particular interest happened until January 25, 1940, when a large brown house spider in the apartment of young Mrs. Latrodectus caught her off guard and suddenly put her "on record", as far as the family genealogy was concerned.

All thoughts were now turned to the occupants of old apartment one, for here were the children and grand-children of the two Mrs. Latrodectuses. Only two daughters remained along with some four or five young sons which were quite mature. In order to avoid a catastrophe, one young female was removed to another apartment, leaving a single female in the first apartment. On February 20, 1940, the observer was brought to quick attention, for during the night Mrs. Latrodectus III had fashioned a pear-shaped nest of silky web and filled it with pearly white eggs. These eggs contain an even more potent poison than that produced in the poison glands of the female Black Widow. Extreme caution should be used in handling them. It would surely be a day worth recording when these young emerged, for they would be the great grand-children of Old Mrs. Latrodectus. But the weather was cold, and development slow, and it was not until April 24, 1940, that the first great grand-children worked their way through the tiny opening at the top of the nest, and found their way out into the world.

This apparently was the signal for a repetition of the entire series of events of the past year, for Mrs. Latrodectus III proceeded to deposit egg cases, and these continued to hatch during the season. Finally the observer was forced to bring his records to a close about the middle of August, 1940. Up to that time Mrs. Latrodectus III had deposited twelve egg cases, and was well on the road to breaking the record of Mrs. Latrodectus I. Several young of Mrs. Latrodectus III had practically reached maturity, and it was only a matter of days until egg cases which would produce great-great grand-children would be fashioned by offspring of Mrs. Latrodectus III.

FORTUNES PETRIFIED

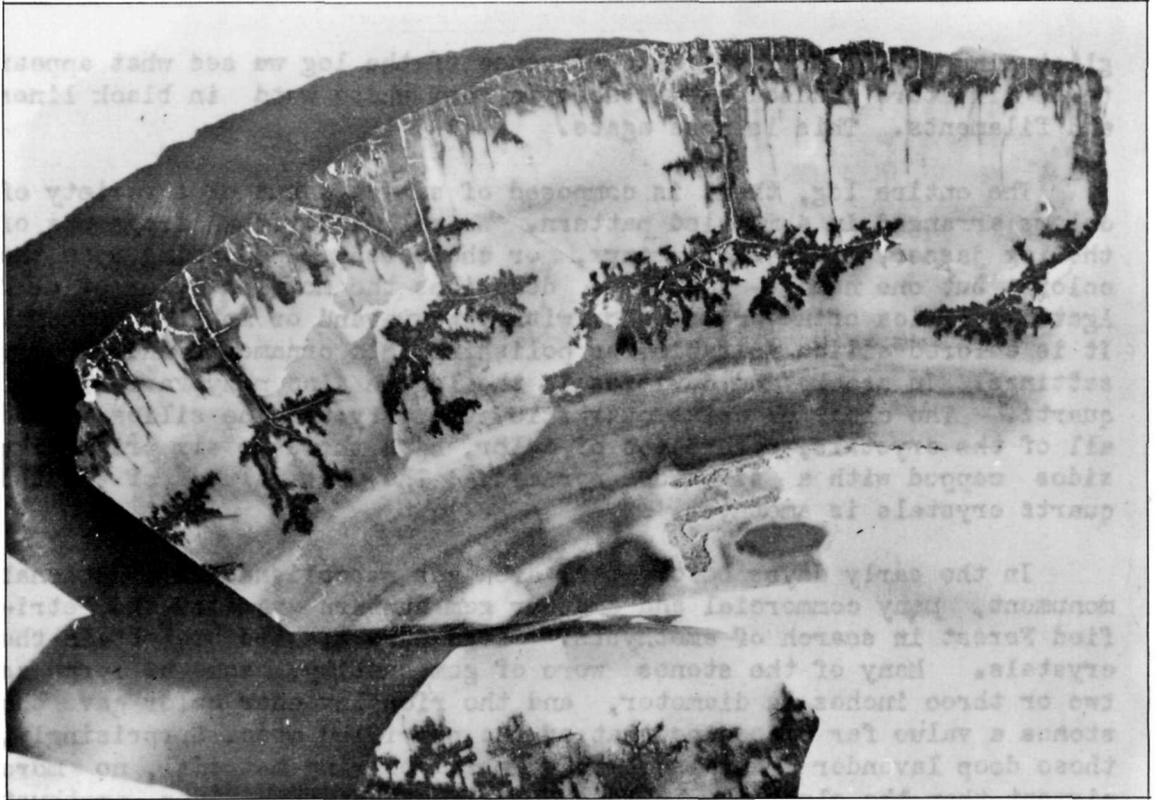
By Howard R. Stagner,
Park Naturalist,
Petrified Forest National Monument.

There is enough agate in the Petrified Forest National Monument, Arizona, to provide a pound of semi-precious stones for each man, woman, and child in the United States. These stones - chalcedony, carnelian, jasper, onyx, etc. - have an estimated minimum value of \$5,000,000, based upon a "timber cruise" over part of the area that accounted for 3,500,000 board feet of petrified wood. A survey of the entire forest would probably double this figure, without even considering the large amounts that are believed to be underground. The average valuation is about ten cents per pound.

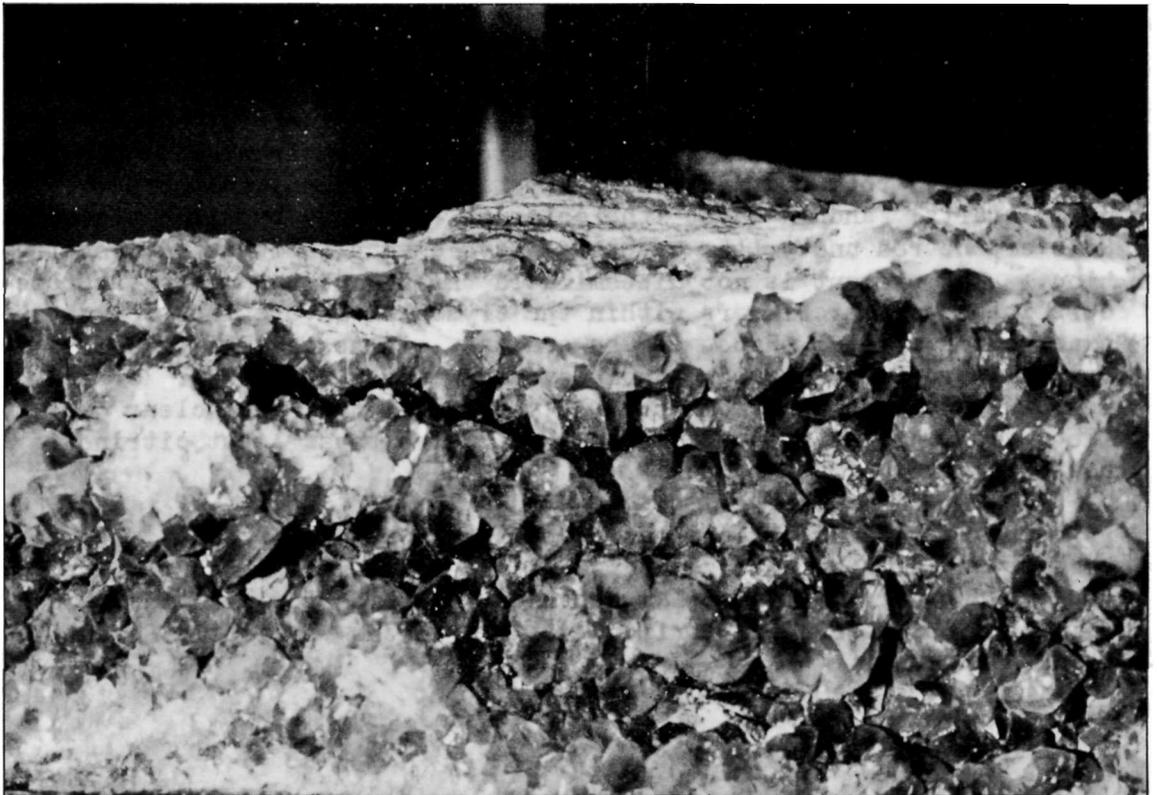
The minerals in the petrified wood, so diverse in color and form, are but different variations of one chemical material. We give the varieties many names, but essentially all are forms of silica, which is a common constituent of the earth's crustal rocks. It makes up about half of the composition of these rocks. In granite and in sandstone we recognize silica in the form of small, glassy quartz grains, but in most other rocks the silica, although present in quantity, is locked up, its identity hidden, as it exists in combination with alumina, potash, iron, water and other rock-forming materials. It is the left-over silica, the surplus after Nature has used the needed amount in building up the minerals, or the silica salvaged when these minerals are torn down by weathering, that is deposited to form chalcedony, agate, and quartz.

Quartz is silica in crystalline form, or of crystalline internal structure. Chalcedony is amorphous or non-crystalline silica. There are other types but these are the common, general classes, the two that are of chief interest in the Petrified Forest. All of the semi-precious stones associated with the petrified wood are varieties of these two forms of silica.

Now, let us take a look at a polished cross-section of a petrified log, and see just what these varieties are. Here we see several large, irregular spots of white or translucent blue-gray. This is chalcedony in its natural color, unstained by impurities - pure, amorphous silica. The rest of the log consists of the same basic material, but is stained a variety of shades and colors. Over here the chalcedony is delicately tinted pink or red, and we call this color phase carnelian. The red deepens over here into the flaming opaque color of jasper. This side of the log is predominantly yellow, grading from a pastel shade to brilliant canary yellow, and over here is a spot of a rare, dark green. Thus we add yellow jasper and green jasper or plasma to our list of stones. Black areas stand out here and there in sharp contrast to the white and colored wood - jet black,



MOSS AGATE



STONES IN THE ROUGH

glistening onyx. Near the circumference of the log we see what appear to be miniature landscapes, traced in the white wood in black lines and filaments. This is moss agate.

The entire log, then, is composed of silica, but of a variety of colors arranged in a mottled pattern. We call individual fragments of the log jasper, carnelian, onyx, or chalcedony, depending upon the color; but one name - agate - describes the mottled color of all. Agate is silica of a varied color, with a wavy band or mottled pattern. It is colored silica suitable for polishing into ornaments and jewelry settings. In cracks and cavities in the log we find many varieties of quartz. The clear or white quartz is pure, crystalline silica; and all of the crystals, regardless of color, have the same six prism-like sides capped with a six-sided pyramid. The most valued of all the quartz crystals is amethyst.

In the early days before this area was established as a national monument, many commercial and amateur gem hunters visited the Petrified Forest in search of amethysts. Logs were blasted to obtain the crystals. Many of the stones were of gem quality, some as large as two or three inches in diameter, and the rich lavender color gave the stones a value far exceeding that of the petrified wood. Surprisingly, these deep lavender crystals have no more coloring material, no more pigment than the clear, colorless quartz. What then gives amethyst its rich color? Scientists are not entirely agreed, but the color is probably a physical one like the colors of the rainbow, and is the effect of some peculiar internal crystal structure on light passing through the quartz.

Some of the smoky quartz, like the amethyst, owes its color to a physical cause, and contains no black coloring material. Other black crystals, however, contain small particles of black iron oxide pigment. Occasionally, too, red and yellow crystals are found, and more rarely, green quartz; and in these the color is produced by iron pigments. Some of the red and yellow crystals have a very interesting construction. The pigment is not disseminated throughout the quartz, but occurs in one or more layers within the crystal - layers that follow the exact outer crystal shape of the quartz. It is as if a small quartz crystal were first formed, then covered with a thin layer of red or yellow iron oxide, and completed by the addition of more clear quartz. The yellow variety is sometimes called "false topaz", but citrine is a better name.

The petrifying process has stopped in northern Arizona. No more agatized wood is being produced, and when one fragment is removed, it is gone forever. Federal law provides penalties for removing even as much as a chip of this petrified wood from the Petrified Forest National Monument.

THE BIG BEND OF TEXAS

By Dr. Ross A. Maxwell,
Regional Geologist.

To reach the Chisos Mountains in Texas by automobile, one must travel 80 miles from Marathon, or approximately 110 miles from Alpine, in the southwestern end of the state. A few miles south of Marathon, pinkish-white and yellowish-white ridges will be seen on each side of the road. These were laid down in a horizontal position in the bottom of an ancient ocean that at one time covered that part of the continent. After many years these rocks were folded into mountain ranges, believed to have been formed contemporaneously with the Appalachian Mountains. The rocks in these mountains were subjected to weathering. The rain fell, the wind blew, and the rocks were broken up and carried away by streams until only the roots of this mountain range remained.

Many years later, during a period of the earth's history that geologists call the Cretaceous, the sea again advanced over this area and buried the old mountains under several hundred feet of Cretaceous sediment. Since then, erosion has stripped away the Cretaceous rocks, and again the roots of the old mountain chain are exposed.

Continuing south from Marathon there is a mountain range on the west side of State Highway 227 that extends from the approximate latitude of Marathon on the north, southward across the Rio Grande into Mexico. The northern half of the range is called the Santiago Mountains, and the southern half, the Sierra del Carmen. Local usage has popularized the term "Dead Horse Mountains" for the southern half of the Texas portion of this range.

About 40 miles south of Marathon, the highway passes through an opening in this mountain range; this is Persimmon Gap, the entrance to the proposed Big Bend National Park. If you stop at the highest point in Persimmon Gap and look around, you will see rocks that were deposited during the same geologic era as those a few miles south of Marathon. This is a second exposure of that ancient mountain range that was formed millions of years ago. The upper walls in the gap are formed of Cretaceous limestones and shales that were deposited in the ocean which covered the old mountain range. As you pass from the gap the largest group of mountains on the right is the Rosillos, so named because of the roan color. Almost in front, but slightly to the right, is the largest and highest mountain group in sight. These are the Chisos Mountains, meaning "Ghost" or "Phantom" mountain. These rugged peaks are the highest in the area and rise to approximately 8,000 feet above sea level.

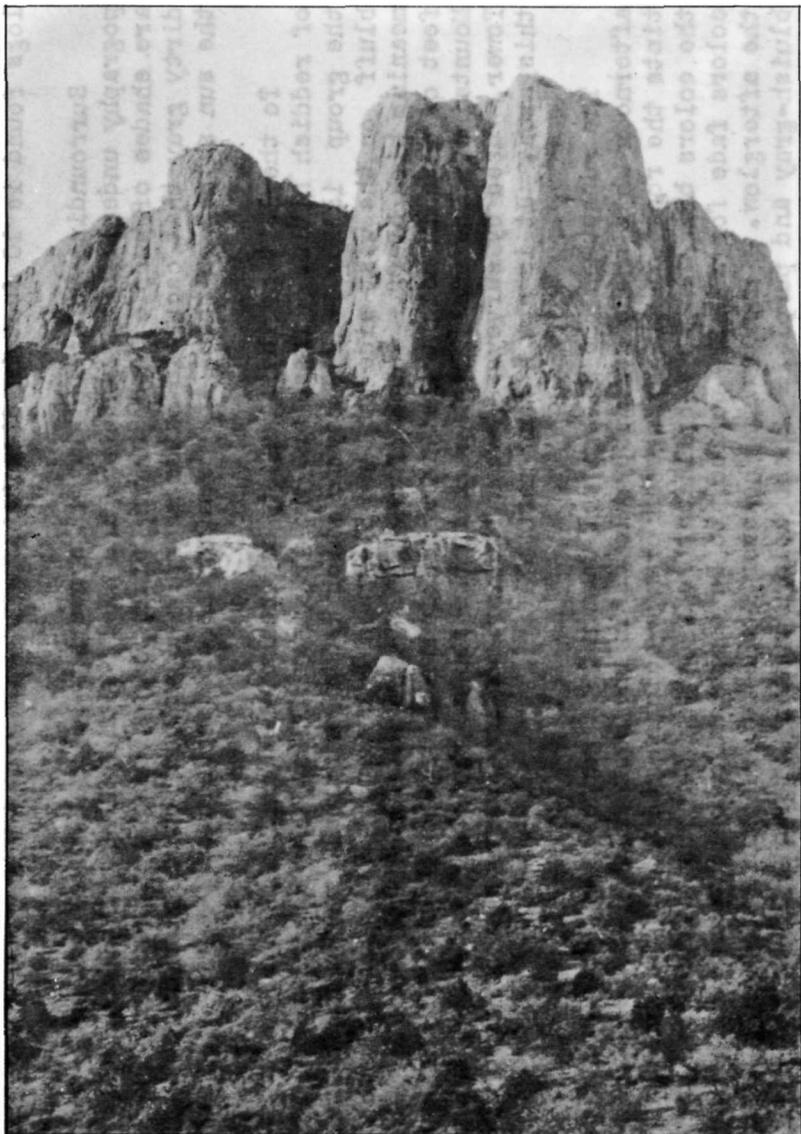
After leaving Persimmon Gap, the highway follows parallel to the Santiago Mountains (on left). If the car has been moving at a normal

rate of speed, you should soon see on the left a sharp narrow canyon. This is Dog Canyon, or Bone Gap, and is the dividing feature between the Santiago Mountains on the north and the Sierra del Carmen (Dead Horse Mountains) on the south. It is about 200 feet deep and averages 75 feet in width. A dim auto road turns off the highway to it. On the west side of the mountain about two miles south of Dog Canyon (left of highway) is another narrow canyon that averages 50 feet or more in depth and in places is less than 10 feet in width. This is Devil's Den, or Devil's Canyon. You will soon be riding over a road where there are several dips. These have been cut by streams that flow down the western slope of the Sierra del Carmen. The running water is able to carry a big load of rock debris down the mountain side, but when the stream reaches the gentle slopes at the foot of the mountain, the load is deposited. This surface that slopes from the mountain is virtually all composed of rock fragments that have been washed from the tops of the Sierra del Carmen.

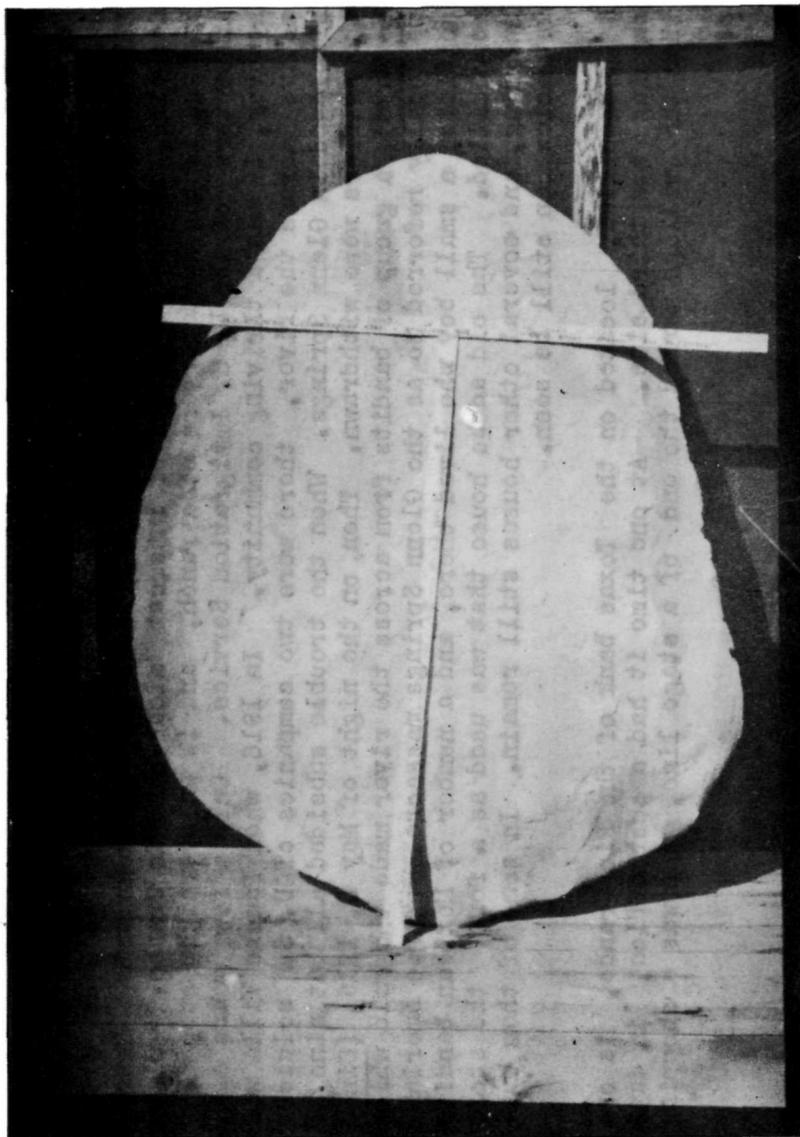
A short distance farther there are a few exposures of gray limestone. This stratified rock is the Boquillas flagstone. It was deposited in the Cretaceous sea, and, with the materials that compose the flagstone, there are thousands of fossil shells of oysters, clams, snails, corals, and sea urchins. These animals lived in the ocean and when they died their shells fell to the bottom and were petrified in the rock. Some of the fossil oyster shells are unusually large. It is not uncommon to find them 18 inches in diameter. One fossil clam 49 inches in length has been found.

When you have driven about 55 miles from Marathon, the road will lead diagonally across a flattish area. This is Tornillo Flat. The soil is very impervious to water. The rainfall soaks into the upper few inches of the soil and makes a very sticky mud. When the water dries, the mud cracks and breaks into little pellets. This area is the desert of the Chisos country. During the dry season, there is little vegetation except creosote bush and lechuguilla, but following a shower the plants spring up as if by magic. In a few days they are in blossom and the desert is clothed in a robe of gorgeous colors. This vegetation lives for only a short time. Following the next shower, new and different kinds of flowers appear. This procedure continues throughout most of the year.

In Tornillo Flat there are several sandstone hills and ridges. In and around them are petrified logs and the bone fragments of dinosaurs. The dinosaurs roamed over this country about 100 million years ago. Some of the unfortunate monsters became stuck in the mud and died. Their bones were covered with mud and water and were later petrified. Weathering and erosion have uncovered the bones and we now find them on the surface. Contemporaneous with the dinosaurs were forests, and likewise some of the trees were petrified. Many fragments of wood and some logs may be seen nearby. The largest of the



CASA GRANDE



GIANT PETRIFIED CLAM

logs found is 10 feet in diameter.

Surrounding Tornillo Flat is a rough, hilly belt of bad land topography underlain by sandstone and shale with brilliant colors. There are shades of purple, red, brown, pink, white, black, olive drab, and dirty gray that occur in bands sharply separated from each other. As the sun shines on them, they remind one of the Painted Desert.

To the left of the highway, southeast of Tornillo Flat, is a belt of reddish hills. These are the McKinney Hills. The highest peak in the group is Roy Peak, beyond which is a vertical westward-facing bluff on the west side of the Sierra del Carmen. It is Alto Relex, meaning high bluff. South of the Rio Grande is a vertical cliff 2,000 feet or more in height that is a continuation of the Sierra del Carmen Mountains. The small high peak at the top of the bluff is called Shot Tower, used by surveyors when the various land surveys were made of this area. It is now a land mark.

The sunset on the Sierra del Carmen is a gorgeous sight. In the afternoon when there are wispy clouds in the western sky, the sunlight tints the rocks in this range an orange-colored glow. As the sun sets the colors brighten to a brilliant red. After the sun disappears, the colors fade for a brief period to be temporarily brightened again by the afterglow. Eventually, however, the colors change to pink, then bluish-gray and purple. These colors remain after the light has disappeared from the other mountains, gradually fading into the neutrality of twilight and then changing to the blackness of night.

The highway continues across the flat to Tornillo Creek, a broad dry wash, except after a rain, when it becomes a treacherous torrent. A few miles farther the highway forks; the left fork goes to Glenn Springs, Boquillas, San Vicente, Mariscal Canyon, Johnson's Ranch, Castolon, and other points of interest along the Rio Grande. Glenn Springs is the headquarters of a ranch, and is an overnight stop for inspectors of the U. S. Immigration Service. Only a few years ago, however, it was a thriving community. In 1916, when Pancho Villa was active across the river, there were two companies of U. S. soldiers stationed in Glenn Springs. When the trouble subsided all but nine of the soldiers were withdrawn. Then, on the night of May 5, 1916, (Cinco de Mayo), a group of bandits from across the river made the raid which is locally referred to as the Glenn Springs massacre. Three American soldiers, a small boy who lived there, and a number of Mexican bandits were killed. The old adobe house that was used as a fort, the store building, and several other houses still remain. In some of them bullet holes can still be seen.

Boquillas, located on the Texas bank of the Rio Grande, is occupying its third site. At one time it had a post office, in days when the village marked the end of a stage line, and was a stopping

place for travelers from Mexico. Now there are less than half a dozen homes, and only a few children to attend its public school. Though seldom used as such, it is still a port of entry. The traveler who stops there can be assured of an excellent meal in the isolated wayside inn.

The head of Boquillas Canyon is a short distance down the river from the village. This canyon was cut by the Rio Grande across the Sierra del Carmen ranges. It is noted for its depth, narrowness, and the sheerness of its walls. It was near the head of this canyon, in 1882, that Captain Charles Neville and his Texas Rangers came upon a band of Indian raiders. The Rangers' ammunition supply was low and much of what was left was used in firing at the Indians, who took to the mountains without their horses. The rangers were traveling by boat. They didn't want to leave the horses for the Indians to remount and ride in further raids against the settlers. Ammunition was too valuable to be used in killing the animals so the horses were blindfolded and knocked in the head. Since that time some people have referred to this canyon as the Dead Horse Canyon.

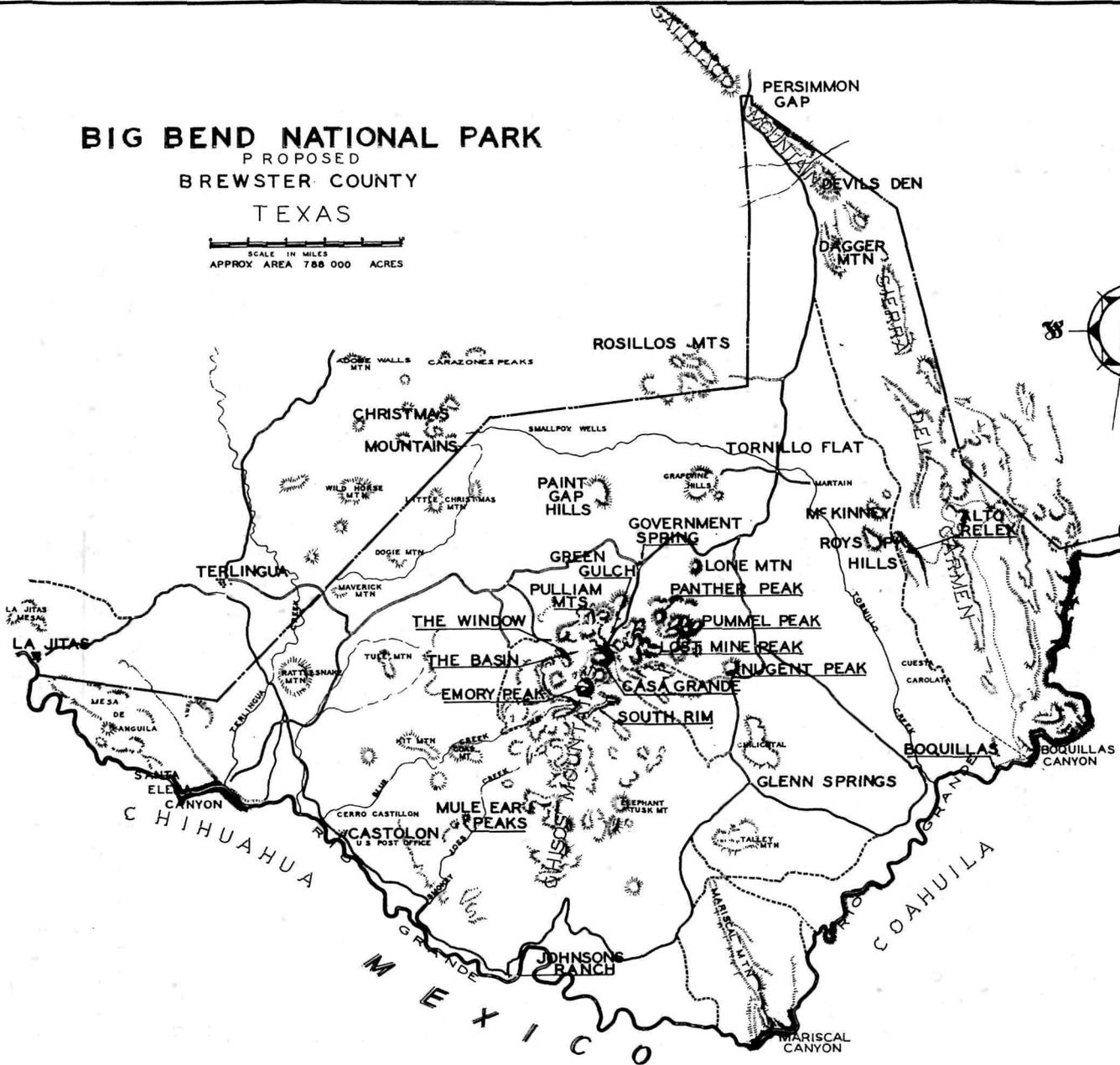
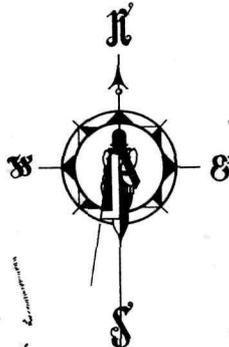
The right fork of the road, beyond Tornillo Creek, leads to the Basin of the Chisos Mountains, where the proposed Big Bend National Park headquarters will be established. At this point the speedometer should register 66 miles from Marathon. Here one can get a good view of the Chisos. The farthestmost peak on the east (left) side of the Chisos is Nugent. The next one from left to right is Pummel, so named because of its similar shape to the pummel of a saddle. The next peak is Panther Peak, and the higher peak behind Panther is Lost Mine Peak.

The big square-topped mountain in the gap to the right of Lost Mine is Casa Grande (big house), and the large bluff on the right side of the road is Pulliam Mountain. Near the road on the left hand side is a mountain that stands away from the rest of the Chisos group. This is Lono Mountain. About 6 miles farther the highway passes the two ranch houses near Government Springs, from where there is a good view of the Christmas Mountains. They lie 12 to 15 miles to the northwest. The Paint Gap Hills, a low belt of red hills, lie about four miles north of Government Springs. A short distance past the ranch houses the road forks again. The right hand fork (Highway 227) goes to Terlingua, a quicksilver mining district outside the park area.

Terlingua is a quaint little Mexican village, where the chief period of celebration is Cinco de Mayo, May 5, in observance of the Mexicans' defeat of Maximilian. A few days before this holiday, the houses, cometary, and community center are decorated. A baile (dance) is usually held and the villagers come in their best costumes. The dance is at the community center, a small house with outdoor concrete dance floor. Current for electric light is provided by windchargers. The musical instruments are usually violin, guitar, and harmonica.

BIG BEND NATIONAL PARK
PROPOSED
BREWSTER COUNTY
TEXAS

SCALE IN MILES
APPROX AREA 788 000 ACRES



The baile may continue throughout the night. It frequently extends into the following day and night. It is a gala occasion and very few of the natives ever miss it.

The left hand fork goes to the heart of the Chisos Mountains, through Green Gulch. Pulliam Mountain is on the right; a spur of Lost Mine Peak is on the left, and Casa Grande, near the head of the gulch. The road, although it may look level, is uphill all the way. Most cars have to use second and low gears before they reach the top. When you reach the top of the divide, and start down, you obtain the first view of the Basin, a depression in the heart of the Chisos Mountains. The floor of the Basin is approximately one mile above sea level. It is completely surrounded by a mountain wall 1,000 to 3,000 feet high. As the road winds down to the headquarters area, where the CCC Camp is now located, you may look through a gap in the mountain wall - the Window - and see across the desert lands of the Big Bend, and on for miles into Old Mexico.

The image of old Chief Alsate (Ol-sot'-ee), legendary Apache watcher of the Chisos, has been carved by nature in a volcanic rock formation and can be seen from the mouth of Green Gulch, south of Government Springs. Though lying on his back atop the massed remnants of a boiling river of destruction, his head is elevated and he is facing Lost Mine Peak. The local legend is that to find the "lost mine", one must cross the Rio Grande into Mexico and there, opposite San Vicente, Texas, in the early morning hours of Easter Sunday, stand in the doorway of the ruins of San Vicente Presidio. As the sun rises over the Del Carmen Mountains, at the back of the hopeful watcher, it is supposed to shine directly into the mine's doorway, "somewhere" on Lost Mine Peak.

From the Basin one may travel by horseback to the South Rim of the Chisos Mountains. This rim has an elevation of more than 7,000 feet and is approximately one mile above the Rio Grande, 16 miles to the south. From this point of vantage on a clear day, one may see for a distance of at least 100 miles, a panoramic view of one of the last frontiers and one of the finest in the Southwest.



HUNTERS



ANIMAL FAIR

By Paul and Greta Ezell

(Paul Ezell was a Seasonal Ranger in Walnut Canyon National Monument, Arizona, during the Summer of 1940)

They must have watched us secretly for a long time before they decided to show themselves near our tent. Soon they were taking the food we put out in front, and climbing on the out-door table where the dishes were stacked after meals. But at our first movement they vanished.

Officially they are known as the Chestnut Mantled Ground Squirrels, but that was too much for us so we called them "the brats." At our meal times they would seek vantage points outside the tent and sniff so eagerly that we had to put food out for them before we could enjoy our own. They would pick it up in their paws and turn it around and around as they bit on it, feet firmly placed, with an amazing arch in their spines, and their heads pushed forward so that their ears were out in front of their feet. Why they didn't topple over is still a mystery to us. Mere size of morsel never bothered them so long as it was edible. One got hold of a slice of dry bread and started for home with his head high to keep the bread from dragging. Misfortune befell him when he hit a rock and he went end over end.

We sometimes put out a whole slice of bread so that we could enjoy their antics. Standing on the bread one would get a firm grip near the edge and lift it mightily, without seeming to notice that he was trying to lift himself at the same time. When he finally got his feet planted on the ground, and could lift the bread, he usually had the slice out in front, with the far edge barely clearing the ground, and his view of where he was planting his feet effectually obscured. He would travel by a ludicrous series of high hops, but eventually the lower edge of the slice would meet the ground before he did, and over he would go.

They seemed at first to number a single family - mother, with her right ear split; father, with a hole through one ear, and a long scar across his nose; and two or three youngsters, of whom we could only identify "the runt." He was a pathetic little creature, picked on by the rest. Perhaps because of that, he was the most daring in entering the tent, and the first to take food from our hands. Later we counted seven in view at one time, so that at least part of another family must have moved in on us.

Sometime around the first of July we began to notice the Arizona Chipmunks and the Gray-Collared Chipmunks watching us from small trees, and surreptitiously taking the food thrown out to all comers. It was the third week in August before the "chips" would take food held in the hand, and even after a month they would not do it consistently.

Generally they sat at a distance with one paw drawn up and clenched, as though they were nervous or the paw was cold. They learned the meaning of the throwing gesture, and will start running to the spot before the food falls. Evidently they gather courage from the example of the brats, who have to overcome their own timidity anew every morning, for they are much bolder in taking food from us when they have company.

The brats go to bed before the sun has set, but are never up until well after sunrise. The chips are early risers but they stay out at night, foraging until almost dark. One explanation of the brats' improvident habit of sleeping half of their lives away may be faulty vision. Both will wash their faces with their paws and rub their faces in the dust. Sometimes the chips seize their tails in their paws, bringing the end around and using it for a wash rag. They scratch for fleas with their hind paws, and rub against the shaded ground to cool their bellies. One incautiously lay across an ant road, and sent us into hysterics by his frantic efforts to remove the pests.

In contrast to the peaceful, silent chips, the brats are a quarrelsome, selfish, brawling lot. No matter how much food there is, no two can eat at the same time. While one is chasing another away, a third dashes in to snatch a morsel and be off before a fourth can launch an attack. When angry or frightened, they fluff their tails and hump their backs like a cat. They will run from a chip, although twice his size, if he comes at them fast enough and hard enough. Their quarrels seem largely a matter of vocal abuse, gymnastics, flight and pursuit. Occasionally they clinch and roll over and over, even less frequently stand and spar, but mostly they poise head of one to the tail of the other and chase each other in a small circle, ending with a mutual jump in the air and pursuit with synchronized sound effects. No one ever seems consistently the victor, and despite scars apparently resulting from previous contests we never saw a wound inflicted.

Once the brats got over their first fear, they worked up from outside to inside the door, to up on the beds, to our laps, to the edge of the table and finally our plates. Somewhere in the process they acquired rights to the whole tent. They climb up our arms and backs, getting purchase with their claws, and sit on our heads and shoulders. Perched on a wrist, the movement involved in cutting up an apple did not bother one so long as he was regularly supplied with pieces. One industriously wrestled an apple out of a sack and strutted out on tip toes with a prize as big as himself. Nothing short of thick wood and solid metal will stop them. Cans with tops that push on are of no avail, as they are knocked off the shelves and the lids fall off. Cardboard is as nothing to their teeth, and even our presence is no hindrance.

At first they would run at a shout. When that lost its effect we added arm-waving and foot-stamping. Eventually it reached a point where even throwing something in their direction only gave temporary surcease. Slapping them lightly on the nose or picking them up off the

table and dropping them on the floor, where they invariably land on their feet, doesn't dismay them. For a while they feared a fly swatter, but now they come back every time and we get tired before they do and let them have what they want. Often they enter the tent by circuitous paths. A hole dug under the back wall is favored by the most timid. Others climb over the wooden sidewalls when the side curtains are rolled up. Only the boldest habitually use the door. A favorite stunt is to leap up and support themselves with only the head showing over a sidewall, while they scrutinize us for possible inimical intentions. They often mount the roof of the tent, with much sliding and scrambling- we have never been able to decide what they feel they gain by it.

One day we fastened a string around a crust of bread and placed it just outside the tent. One brave soul came foraging, picked it up and dashed off. When he reached the end of the string the bread snapped out of his mouth and he rolled over and over. Presently he staggered back and spent several minutes looking for it. After three or four tries involving much rolling and searching, the bread fell the last time with the string almost stretched tight. This time he was not going so fast when he reached the end of the string, and he hung on to the bread. He pulled like a bronco on a rope until finally the bread broke and he got his reward.

They are greedy little things and will eat almost anything except meat. Frequently they balance starch and fruit. Bread and crackers were our first offerings and still are the stand-by. Of the vegetables, carrots and cucumbers are the only ones they eat consistently. They nibble at celery, eat tomatoes and potatoes in desperation, will have nothing to do with onions, but finish off garlic with gusto. Fruit salad is their main joy. They have developed a sense of time, and at lunch-fixing periods they invade the tent on the dot to get their ration. They will ignore other food to collect rice or dried beans in their cheek pouches, departing hurriedly to store these morsels and return for more. The bean-laden pouches rattle as the brats walk or run. One brat has consistently stuffed his cheek pouches with everything set before him, doubling his face width with no effort. He sits on the table and scolds while we scratch his belly and feel his pouches, but goes on eating. One day he tried to grab a pawful of pipe smoke.

The chips will eat only grapes and pears, with an occasional apple to balance their bread and crackers and rice. They eat quietly and seldom quarrel over possession of food. Once in a great while we see them bury food, but it seems, except for rice, to be eaten generally on the spot. We have never seen the brats foraging for themselves, but several times we have watched the chips feeding on the vegetation around camp. Early in September, signs of the approaching winter showed when a chip tried to run away with some yarn hanging

from a loom; and a tearing sound brought to our attention a brat ripping a newspaper and cramming his mouth. About this time we began to miss the tassels from our Navajo rug.

The danger signal, which we can best imitate with a short, high, sharp whistle; is almost invariably given by the chips. The first time we noticed it, chips and brats were eating their lunch when a whistle sounded, followed almost immediately by another one even more whiplike in its urgency. Every one of the animals vanished instantly. As we sat listening, there was another whistle with an added quality of surprise and terror simultaneously with the sound of the heavy beating of wings. A hawk had swooped but apparently missed, as he had nothing in his claws. The first chip appeared within 20 minutes and they had all resumed eating within half an hour, but they seemed nervous the rest of the afternoon.

One day the diners scattered in a half-hearted manner following the alarm, and a Sparrow Hawk came around the corner of the tent. He was cursed steadily as long as he was in sight, in a soft throaty bark by a chipmunk who retired no farther than just under the edge of a log, and came out as soon as the hawk had passed. One enterprising chip turned their faith to his advantage. As the rice supply diminished, he whistled very convincingly. When the rest ran, he continued eating, emitting whistles at short intervals. No one stopped to argue with him, and for a short time he had the field to himself.

Occasionally we have a visit from some Aberts, or Tassel-eared squirrels, but they are not sociable. Once we put out some hamburger, hoping that it would attract a night prowler. The next morning we saw one of the long-eared fellows eating it. He would take a piece about the size of a golf ball and carry it 50 feet or so to eat it. Finally he stayed beside the meat to finish it off. Evidently our movements didn't bother him, but the click of the camera caused him to leave. The brats and the chips did not seem to be particularly afraid of him, but they gave him plenty of room.

Ordinarily the Abert hops like a rabbit, but once we saw one walking, one foot at a time, as the brats often do. When one was cornered in a tree he jumped from a height of nearly 50 feet, and hit the ground running. One day when a chip ran toward him, Tassel-ears "froze," except for his tail which twitched as does that of a hunting cat. When within about 5 feet of the squirrel, the chip saw him. As the larger animal leaped, the chip fled so swiftly that he was a dozen feet away when the hunter landed. The squirrel made no attempt to pursue, but ambled off in another direction, appearing slow and clumsy in comparison with the smaller rodent.

AMERICAN ARCHAEOLOGY

By Erik K. Reed,
Regional Archaeologist.

The major conclusions or hypotheses of American archaeology as it stands today will be only briefly sketched, without detailed presentation of the evidence. Few conclusions are really conclusions rather than hypotheses; most of the important questions are still wide open. For a general background, human history in the other hemisphere might be broadly outlined. Man's ancestors developed out of an ancient generalized giant primate stock, probably in the Pliocene period, several millions of years ago, not from any contemporary anthropoid apes or even from apes similar to the latter, but on a separate line of specialized development out of a very generalized sort of giant primate which also gave rise to the modern apes. Fossil men of great antiquity, "ape-men" or "missing links", have been found in many parts of the Old World. Whether our species of man is actually descended from any of these is questionable; they are probably cousins rather than grandfathers.

A million or so years ago man commenced using stones and sticks and then actually shaping them to be more useful for his purposes. That was the first beginning of culture and civilization. Our own species seems to have already been in existence at this time. About forty or fifty thousand years ago the last competitor, or other type of man also using tools, the Neanderthal species, died out. By that time the basic rudiments of society and religion had undoubtedly already developed in a very primitive way: art begins soon after, with statuettes and cave-paintings.

Later, perhaps 10,000 years ago or thereabouts, came the most important steps in human progress since the first use of stone - the domestication of plants and animals, and the invention of pottery. Housebuilding, the fourth major element of neolithic civilization, goes back earlier, into paleolithic times. The civilizations of Mesopotamia, Egypt, northwest India, and north China began to take form. The next great step was taken - the utilization of metals - copper, then bronze, soon after. The use of bronze begins in the Mediterranean world early in the fourth millennium B.C.: of iron, not until the late second. Bronze seems to have reached China only in the middle or early second millennium B.C. Later developments in the Old World do not concern us in connection with the prehistory of the New World. It might be mentioned, however, that by the time bronze appears in China, certain other traits which were never known in America, notably the wheel, were in use.

The New World was occupied late in human history, from the Old

World. The ancestors of the American Indians crossed into Alaska from Siberia, by way of Bering Straits. The first that came, many thousands of years ago, were not typical Indians as we know them. They were less mongoloid than modern Indians, and were probably brown-skinned people with wavy hair. Only much later the mongoloid racial type, people resembling Chinese and Tibetans, enter the New World and overrun and submerge these early peoples.

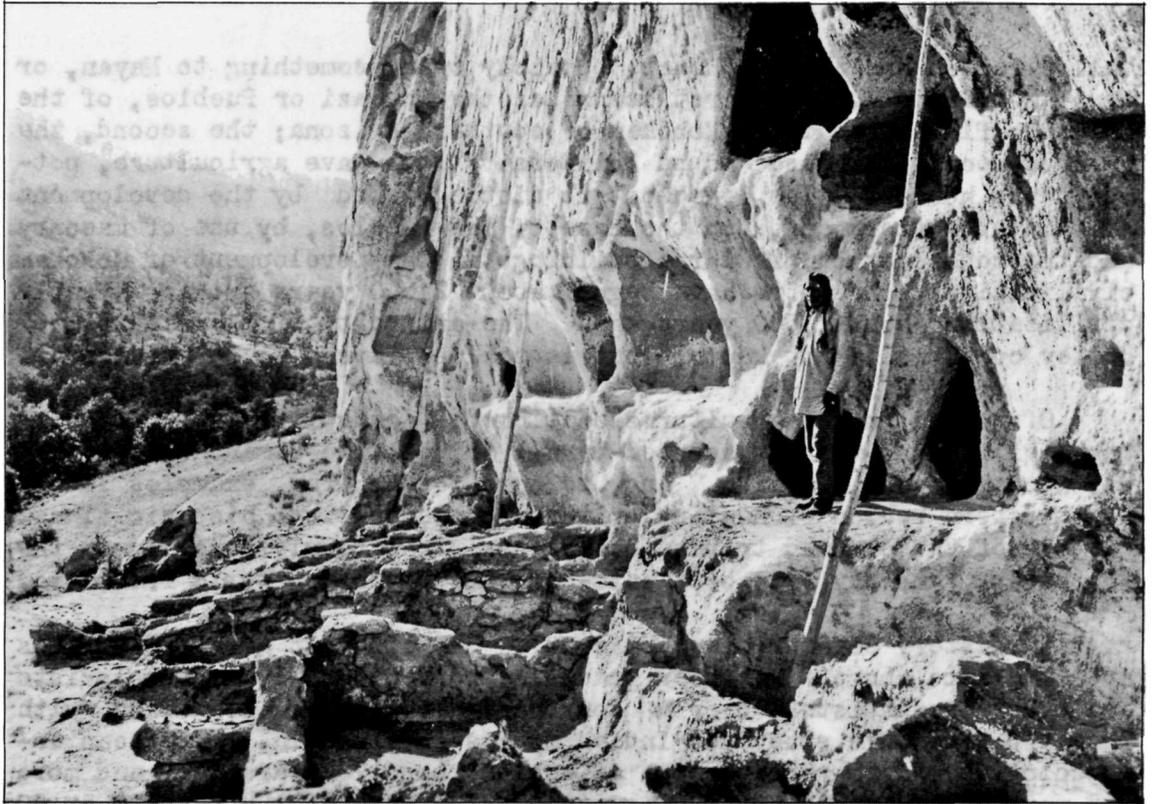
The date of the first immigrations into America is unknown, but it was much earlier than was formerly believed. An antiquity of 50,000 years for man in America has been suggested, and is not impossible. The earliest cultural remains known in America are the Folsom complex, generally considered to be about 10,000 or 15,000 years old, and the Abilene and Cochise complexes, believed by some to be still older. Thus the occupation by man of the New World took place during late paleolithic times, before the development of pottery, and metalurgy, and before the domestication of plants and animals. Presumably immigration from Asia continued, sporadically, into later times.

The cultural equipment brought by the first immigrants, that of the Folsom group and other early peoples, was of necessity very simple, as neolithic civilization had not yet developed in the Old World. It included very little material culture beyond chipped stone instruments, presumably some wooden implements, and probably basketry. None has been found.

Much later, civilization develops in many portions of America, with permanent houses, agriculture, and pottery; apparently an independent development parallel with that of neolithic civilization in the Old World, lagging far behind the latter in time, but arising out of the same paleolithic hunter basis. It has been recently suggested, however, that all the major elements of American civilization were brought in by late immigrants from Asia. This is not impossible, but there are many difficulties in such a theory.

Most of America remained neolithic, but metalurgy was learned in southern Mexico, Central America, and northwestern South America. In Peru especially, manufacture and use of bronze was highly developed. Goldwork was very advanced in Panama and Ecuador and Peru particularly, and platinum was used in Ecuador. Native copper was used in North America, in the Southeast and the Great Lakes region. The highest development of American aboriginal civilization occurred in two major areas particularly; in Peru, and in southern Mexico and northern Central America. In the latter area two great civilizations arose, separate though related - the Mayan in Guatemala and Yucatan, and the Mexican or Toltec-Aztec, in the Valley of Mexico.

In the territory of the present United States, advanced cultures arose in two areas - in the arid Southwest, largely due perhaps to ultimate connections with Mexican civilization; and in the Mississippi



BANDELIER CLIFF DWELLINGS



CASA GRANDE RUINS

Valley region and the Southeast, possibly owing something to Mayan, or Mexican influence. The first comprises the Anasazi or Pueblos, of the Colorado Plateau, and the Hohokam of southern Arizona; the second, the various peoples labeled "Mound Builders." Both have agriculture, pottery, and houses. The Southwest is distinguished by the development of painted pottery and, in the case of the Pueblos, by use of masonry and the construction of large buildings. The development of Hohokam civilization appears to have begun about 2,000 years ago; of Pueblo civilization about 1,500 years ago. The antiquity of the Mississippi Valley cultures is not known, but is not considered to be very great.

Of course, hunting cultures continued; agricultural pottery-making civilization was not adopted by all tribes. The Comanche, Karankawa, Kiowa, Navaho, Apache, and Ute are outstanding examples in the Southwestern region of hunting cultures extending into historic times. Certain of these nomad tribes arrived only relatively recently in the Southwest, and may have been late-comers to the New World from Asia.

This story of American prehistory, and its vast array of details not gone into above, has been gradually worked out by archaeologists and other scientists, over a long period, perhaps beginning with Thomas Jefferson's study of Indian mounds in Virginia. American archaeology began to receive more attention about 70 years ago, and more and more work has been done ever since. The work of the past 20 or 30 years particularly has added to knowledge of American prehistory. Many institutions that are devoted largely or partially to archaeological research have entered the field. Certain branches of the Smithsonian Institution have been the agencies of the federal government in this field: the Division of Anthropology of the National Museum, and the Bureau of American Ethnology. Another government agency, the National Park Service of the Department of the Interior, has, since its establishment in 1916, been concerned among other things with preservation of the sites themselves, as well as of artifacts from those sites.

The majority of the archaeological areas administered by the National Park Service are remains of the Anasazi, or Pueblo, group: Mesa Verde National Park, Colorado; and the following national monuments: Hovenweep, in Colorado and Utah; Yucca House, Colorado; Aztec Ruins, Bandelier, Chaco Canyon, Gila Cliff-Dwellings, and Gran Quivira, New Mexico; Canyon de Chelly, Navajo, Wupatki, Walnut Canyon, Montezuma Castle, Tuzigoot, and Tonto, in Arizona. Certain of these are not strictly Anasazi, probably being connected ultimately with a distinct cultural root known as "Mogollon", but they are of the general Pueblo type. Pueblo remains occur also in several National Park Service areas not primarily archaeological, such as Grand Canyon National Park and Petrified Forest National Monument, Arizona; Natural Bridges National Monument, Utah; and El Morro National Monument, New Mexico. The Hohokam culture of southern Arizona, very different from the

Anasazi or Pueblo group, is represented only at Casa Grande National Monument. The major structures there, however, are not Hohokam but are remains of a Puebloan invasion of southern Arizona in the 14th century or thereabouts.

The two archaeological areas administered by the National Park Service outside the Southwest are Mound City National Monument in Ohio, a "mound-builder" site; and Ocmulgee National Monument in Georgia, one of the most important southeastern archaeological sites.

The National Park Service has been carrying on, over a number of years, an Archaeological Site Survey, covering gradually all the more important known sites in the United States, from the ancient sites of the Folsom complex and other early cultures, to sites of the historic period (i.e., the 18th and later centuries), in the Southeast and Southwest especially. It is planned to extend protection to the most outstanding of these sites at some future time. At present the Archaeological Site Survey is still in the inventory and investigation stage, as it presents a tremendous problem.

The main lines of activity of the National Park Service in the field of archaeology are, first the protection and preservation of ruins, by regulation of travel and prevention of vandalism, and by stabilization and repair; and, second, interpretation to visitors of the ruins and their significance. The Service is unable to carry on any great amount of research, largely because of limitations on funds, but has carried out several research projects incidental to stabilization work, notably at Bandelier and Tonto National Monuments. Many institutions have done research in National Park Service areas in cooperation with the Service.

THE SPOTTED NIGHT SNAKE

By Russell K. Grater,
Assistant Park Naturalist,
Zion National Park.

One of the least known of reptiles is the Spotted Night Snake, or Rock Snake, (*Hypsiglena ochrorhynchus* Cope). So infrequently is it encountered that the discovery of one is always news of more than momentary value. The snake is small, a 16-inch specimen being a rather large individual. The ground color is yellowish white, heavily peppered with light brown specks which give a general brownish appearance. There is a series of dark brown blotches along the back, generally arranged in two rows of alternating spots. Along the sides are similar but smaller spots in series of two, three, or four. Across the neck are dark blotches, or a dark collar. The pupils of the eyes are elliptical.

Comparatively little is known about this snake, due to its secretive habits. It is nocturnal, seldom being seen in the sunlight, and its discovery is usually accidental. It seems to prefer hiding under loose slabs of rock, and old boards. These hiding places are usually found on slopes near streams, although other types of habitats are utilized. In captivity it is rather restless, and often does not take food readily. It will frequently climb when imprisoned, if given the opportunity, so it may be arboreal to some extent.

Insofar as is known, this reptile is non-venomous. While it possesses two large rear fangs that are faintly grooved, the poison apparatus is lacking. These large fangs are apparently used to puncture the skin of the small lizards that are utilized as food. Practical tests have shown that lizards whose skins are punctured by these teeth die quicker than those that were only badly bitten. It is believed that these punctures allow saliva from the snake's mouth to enter the blood streams of the victims. As saliva is a poisonous substance if introduced into the blood stream, death comes quicker than otherwise.

In 1933 the known range of the Spotted Night Snake was from Idaho, southward into northwestern Mexico, and from southern California eastward to southwestern Texas. More recently it has been collected in Washington, Colorado, Oklahoma, and Kansas, proving that its range is far from being definitely defined. Its habitats include areas from sea level to the tops of mountains and high plateaus. It seems to prefer the more arid habitats of the desert and near-desert life zones. Today, we call the Spotted Night Snake a rarity; tomorrow, it may be regarded as of no unusual interest.

THE SOUTHWEST

By Dr. Aubrey Neasham,
Regional Supervisor of Historic Sites.

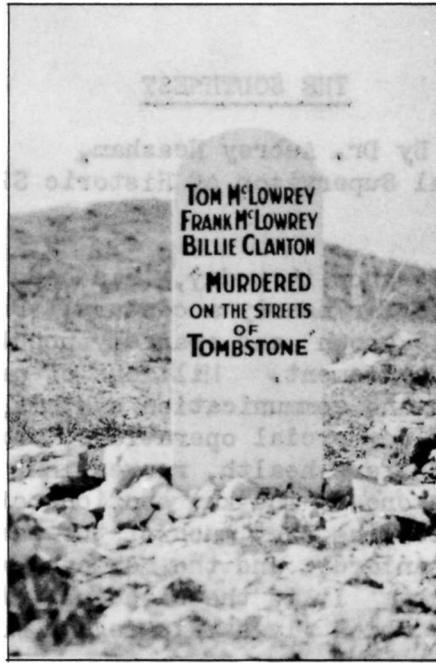
The Southwest, as we know it today, has been under the jurisdiction of the United States for nearly a century. During those years it has emerged from a little known and sparsely populated area to one of great development and advancement. Millions of people, large cities, far-flung transportation and communication systems, vast agricultural, mining, industrial, and commercial operations, and a growing realization that the Southwest offers health, recreation, and cultural opportunities have made this one of the key sections of America. With it all there is still the feeling that much of the past is retained, and that the Indian, the Spaniard, and the Mexican will ever remain as influences upon life here. It is the blending of their cultures and civilizations with ours which gives this region much of its distinctive atmosphere and color.

The story of the Southwest under the United States is a thrilling one. It is typical of the westward movement. Immigration of settlers in ever-increasing numbers, the discovery of rich mineral resources, the formation of new territories and states, the opening of vast reaches of land for agriculture, the resistance of the Indian to the encroachment of the white man, the building of transcontinental railroads, the effects of industrial revolution, and the influence upon national affairs and thought have been important.

The Southwest seemed to have been waiting for the era of American control. Hardly had the United States taken over California when gold was discovered there by James Marshall at Coloma in 1848. This was the impetus needed to bring the settler westward. In ever-increasing numbers the "Forty-niners" came by ship, wagon, horseback, and foot. Many, not finding the wealth in gold which they sought, stayed to settle the country and to develop the other resources.

Not all of those who started for California reached that promised land. Some died, and others, finding lands to their liking upon the way, stayed. Utah, first settled by the Mormons in the latter days of the Mexican regime, was the scene of increased colonization. Texas and New Mexico attracted others. Immigration and settlement were such that California became a full-fledged state in 1850, and the territories of New Mexico, Utah, and Kansas had been established by 1854.

New mineral deposits were discovered during and after the 1850's. The region east of California especially became the center of great activity. In Arizona, copper deposits were worked in Ajo, and placers were found on the Bill Williams Fork in 1862. In Colorado,



TOMBSTONE
ARIZONA



OLD FORT UNION
NEW MEXICO

"Pikes Peak or Bust" became a popular slogan, and the territory around Denver became settled. Nevada and its famous Comstock Lode and Virginia City came into prominence, as did the Bingham Canyon, Little Cottonwood, and Oquirrh Mountain districts of Utah during the 1860's. These strikes led to others, which, in their importance, have made these regions areas of primary mining importance up to the present day.

The story of the mines is one which will always remain an important epic in our history. Over and over again the process was the same. Spectacular strikes were made, rushes resulted which attracted people from various corners of the earth, and mushroom boom towns were started which in their rapid growth were almost unbelievable. The elements of law and order strove to control in the name of decency and self-government, while "bad men" and gamblers endeavored to rule for their interests. The forces of law and order won, through associations and vigilance committees. High prices and speculation gave way to stability. Boom towns of yesterday may be wholly or partially ghost towns today. As one wanders through these historic towns - Virginia City, Nevada; Tombstone, Arizona; Elizabethtown, New Mexico; and many others - there are brought to mind the once thousands of people who, in their mad scramble for wealth, personify experiences of the human race - wealth, poverty, joy, tragedy, and sorrow.

A direct result of mining activity was the formation of new territories and states. Nevada became a territory in 1861 and a state in 1864; Colorado, created a territory by 1861, became a state in 1876; Arizona was made a territory in 1863, and a state in 1912.

The rush to the agricultural lands of the Southwest was greater even than that to the mines. The increasing demand for prairie farms and grazing lands, directly caused by new markets, the invention of farm machinery, the enactment of the Homestead Act, and increased immigration, resulted in millions of people moving westward. It has been estimated that between 1860-1880, 5,000,000 Europeans immigrated to the United States, and that most of them settled in the West.

This rush westward also had its typical scenes. Long trains of prairie schooners toiled toward the horizon, sod houses marked by the ever-turning windmill began to appear in isolated places; and bonanza wheat fields marked regions where once the buffalo and antelope roamed. As in the mining areas, these farms of the prairie were plagued by pests, human and otherwise. Grasshoppers in great swarms at times took their toll of the newly planted crops, as did the cyclone and drouth. Bad men, claim jumpers, and Indians did their best to thwart the advance of the settler. More than one vigilance committee was formed to bring about the enforcement of law and order.

The demand for grazing lands resulted in the creation of many

ranches, some of them of great size. Still typical of the Southwest, they vary in size from a few hundred acres to over 1,000,000. Charles Goodnight in Texas, Lucien Maxwell in New Mexico, Pete Kitchen in Arizona, the Miller and Lux interests in California, and many others, were virtually lords of all they surveyed. The King Ranch in Texas, consisting of over 1,000,000 acres, and now operated by the Kleberg family, retains most of the elements of the ranch of the last century, in addition to modern innovations.

The great cattle drives of the last century from Texas, New Mexico, and other parts of the Southwest, formed an integral part of the life on the range. Historian, novelist, poet, and song writer have all given the story of the famous trails - the Chisholm, Chisum, Western, Shawnee, Abilene, Panhandle, Pecos, Goodnight, and others. These, connecting with the railroads at such points as Dodge City, Newton, and Abilene, Kansas, were the scenes of millions of long-horned cattle being driven north to market after annual or semi-annual roundups. These cattle, taking the place of the ill-fated buffalo, in turn were to give way to such standard breeds as the Hereford and Shorthorn on grazing lands surrounded by barbed wire fences. Today, for the most part, modern transportation methods have ended the long distance drives.

The cattle country also had its lawbreakers and troubled times. Such characters as "Billy the Kid", fighting on one side or the other of famous cattle wars, have become almost legendary because of their prowess with the six-shooter. Rustlers, sheepman versus cattleman, and fence wars were also typical of this frontier scene.

Every move of the white man westward meant impingement upon the lands of the Indian. The area directly west of the 95th meridian had been closed between 1830-1850 to settlement by the white man, but, gradually, the trails to the far West and the pressure for lands resulted in his invasion of this region. By 1854, outside of reservations, the Indian had been relegated largely to that area which is now Oklahoma.

Resistance to the white man was a logical move upon the part of the Indian. Indian wars became increasingly frequent during the late 1850's and up to the 1880's. Famous chiefs with picturesque names rallied their peoples in the last great attempt to throw off the yoke of the usurpers. The Navahos in Arizona and New Mexico were finally defeated by Kit Carson. The last battle of the White Mountain Apaches occurred in Arizona in 1882; and the Chiricahua Apaches, first led by Cochise and then by Geronimo, were finally brought under control in 1886. Other Apaches in New Mexico, Comanches under Quanah Parker in Texas, and Cheyennes led by Black Kettle in Oklahoma, were as famous as the Southern Sioux under Red Cloud, the Northern Sioux under Sitting

Bull, the Modocs led by Captain Jack, and the Nez Perces of Chief Joseph in other sections.

Military posts and forts were established in all parts of the Southwest to protect the traveler and settler against Indian resistance and raid. Forts Yuma and Tejon in California; Churchill in Nevada; Douglas in Utah; Grant, Bowie, Defiance, Apache, McDowell, Whipple, and Crittenden in Arizona; Union, Sumner, Marcy, Cummings, Wingate, Selden, and Craig in New Mexico; Griffin, Davis, Belknap, and Bliss in Texas; and Towson, Gibson, Washita, and Cobb in Oklahoma, were only a few of the important posts. Today, their remains serve as grim reminders that a large percentage of the battles fought by the United States Army during the second half of the 19th century was in the Southwest. Such battles as the Big Dry Wash in Arizona, Adobe Walls in Texas, and the Washita and Rush Springs in Oklahoma, marked the end of effective resistance by the Indian.

The War between the States assumed some importance in the Southwest. Although activities were kept to a minimum in California, Arizona, Nevada, Utah, and Colorado, there was struggle in New Mexico, Texas, and Oklahoma. Texas, controlled largely by Confederate troops, was the scene of several battles. The Gulf area, especially, was important in its resistance to Union forces. The Battle of Palmito Ranch, fought near Brownsville on May 13, 1865, a victory for the Confederates, was one of the last battles of the war. In New Mexico, the Confederates established control for a time during 1862. Defeating the Union forces at Val Verde on February 21, 1862, they were, in turn, defeated at Glorieta Pass, near Santa Fe, by Union forces from Fort Union on March 26, 1862. With this defeat the soldiers of the South retreated to Texas, thus abandoning this important sector on the lines of communication to the Southwest. The Indian Territory of Oklahoma was largely abandoned by the Union forces during the War between the States, and Confederate forces took over several of the important military posts. The Battle of Honey Springs, on July 17, 1863, was one of the decisive battles in Indian Territory. In this battle the Federal troops, commanded by General Blunt, succeeded in defeating the Confederates with a severe loss of life.

One interesting development in the opening of the Southwest was the establishment of new missions among the Indians. During the Spanish and Mexican periods this activity had been carried on by the Roman Catholic Church in the regions of Texas, New Mexico, Arizona, and California, but during the period of American domination the Protestant churches began a similar effort. Indian territory was, of course, the scene of greatest activities. As early as 1820, the Dwight Mission in what is now Sequoyah County, Oklahoma, had been established among the Cherokees by the American Board of Commissioners for Foreign Missions. Other important missions were the Park Hill Mission, the Union Mission,

Tallahassee Mission, and Council Hill Mission. These missions, some of them still operating as schools, served as important cultural, educational, and religious centers for such tribes as the Cherokees, the Osages, and the Creeks. Today in other parts of the Southwest may be seen a number of missions, administered by various denominations, all active in the primary work first established by the Spanish padres.

The opening of the West resulted in increased demands for transportation and communication facilities. In the Southwest, old trails were used extensively and new ones were opened. The Santa Fe Trail reached its greatest height in the period preceding the 1880's. Other routes of outstanding importance were the Texas Trail, utilized by the stage coaches of the Butterfield Company, which ran from St. Louis to Fort Smith, Preston, El Paso, Fort Yuma, Los Angeles, and San Francisco. From Santa Fe and Albuquerque the old Spanish Trail connected with the Texas Trail to the South and the Mormon Trail to the north. The Mormon Trail, started by Brigham Young, extended from Salt Lake City to Los Angeles. These trails, over which hundreds of thousands of immigrants passed, were considered to have been of equal rank with those farther north - the Oregon Trail, Overland Stage Route, Central California Route, Great Salt Lake Trail, and the Bozeman Trail. Offshoots and lesser trails ran from these, connecting areas of lesser importance.

By the 1880's, major travel to the Southwest had changed from the wagon, stagecoach, and horseback to that of the railroad. The methods of the days of the pony express, although spectacular and picturesque, were no longer sufficient to meet the demands of faster mail and travel. Official explorations, sponsored by the government as early as the 1850's, had been made to determine the best routes for railroad construction. By 1884, bands of steel from east to west had tapped the important centers of the Southwest. These railroads, following often the older routes of travel, had been made possible through a system of land grants and subsidies from the government to the chartered companies. The Union Pacific, completed in 1869, was followed in turn by the Atchison, Topeka, and Santa Fe; the Southern Pacific, and the Texas and Pacific. Such individuals as Stanford, Crocker, Huntington, Hopkins, Gould, and Strong were outstanding in the building of these railroads. Telegraph lines, in many instances, followed the routes of the railroads.

The inrush of people into the Southwest after the completion of the railroads resulted in the opening of new territories and the establishment of additional states. The Indian Territory of Oklahoma, opened after the passage of the Dawes Act in 1887, became the center of new homeseekers. The movement of the "Sooners" and "Boomers" into this area in successive waves constituted the last important rushes to stake out homesteads. The Indian, deprived of his last great expanse

of territory, was relegated to the reservation. Between 1896-1912, the youngest of the states were created - Utah, Oklahoma, New Mexico, and Arizona.

The development of the Southwest under the United States cannot be dismissed without some tracing of the effects of the industrial revolution. The new inventions and their applications explain much of the settlement of the region. The Bessemer process for manufacturing steel, the development of steam, electrical, and gasoline power, the perfection of the internal-combustion engine, the telegraph, telephone, radio, and refrigeration have made it possible to apply large scale processes to manufacture, transportation, and machinery. The result has been an opening of the region and the exploitation of natural resources. It has been said that the invention of barbed wire, the windmill, and the Colt revolver were primary factors in settlement of the land. By the same token, new processes and methods in such fields as reclamation and irrigation have made the Southwest inhabitable and agriculturally profitable.

Each new phase of the industrial revolution, although increasingly effective in making the exploitation of natural resources possible, also made it apparent that conservation must be practiced. This movement, although having its origin in the West, is typical of the nation as a whole. Gradually, it has dawned upon the people that important areas must be conserved and preserved by public effort, in order that this and future generations may enjoy the natural, scenic, and cultural resources. Retention by the government of large parts of the public domain, as evidenced in the reservation of forest and mineral areas, the development of reclamation and irrigation projects, and the creation of national parks and monuments, has become recognized as necessary in our life as a nation.

The innovations of the Southwest and the West as a whole have truly altered or conditioned our national thought and action. In addition to the examples mentioned above, these innovations have run the gamut from horse and caravan travel, the six-shooter, new methods in mining and cattle raising, dry farming, the barbed wire, the windmill, and well drill, to populism, agrarian crusades, farm relief, and a new literature and folk-lore.

Such is the story of the Southwest, under the United States. This land occupied successively by the Indians, Spain, Mexico, and the United States still holds an individuality and independence of its own. In so doing, however, it has contributed to the making of a nation.

A DIVINE PLAN FOR REST AND RECREATION

By Morris U. Lively,
Senior Chaplain,
Oklahoma District, CCC.

By observation of natural laws, and of the phenomena of nature, it will be seen that an omniscient and an omnipotent Providence has decreed that man must have periods of rest and recreation, as well as re-creation. In order that man may have such rest there must be a time and place for retirement from the activities of life; a time and place when and where man can set the burden down and rest his weary body and soul from the work-a-day tasks, and at the same time he may re-create attitudes toward mental and spiritual values.

A most poignant teaching relative to the value of rest is found in the story of the life of Jesus. Often He said to His disciples, "Let us go aside and rest." His duties were many and trying. At times great throngs pressed about Him, and He, doubtless, found His strength sapped. When He felt that He and His followers needed rest, He would retire to a mountain side, or some other secluded spot, where He could be alone for a period of meditation and quiet. There were even times when He asked that He be not disturbed by the very ones who sought His help.

The thought of places for quiet and rest are illustrated further in the New Testament. Saint Paul tells us that after his call on the way to Damascus he went to the desert for two years of meditation and study. He chose a place away from the hub-bub of daily life where he might prepare himself for the work for which he had been chosen. Another illustration is seen in the story of Saint John. One may envision him as sitting in a secluded spot on the Isle of Patmos as he was told the mysteries which form our book of the Apocalypse.

Likewise the patriarchs whom we meet in the pages of the Old Testament had places of quiet and solitude to which they retired at intervals for spiritual re-creation. Probably it was in a secluded valley (Scripture says it was the "back of the wilderness") on Mount Horeb that Moses had the vision of the burning bush, and where God commissioned him as the general who was to lead the Children of Israel from the Egyptian bondage.

And there is the story of Elijah, who is considered the greatest of all the prophets. Never was there a more sincere fight made for the right than the one which he made against the priests of Baal, and their champion, that archfiend of womanhood, Queen Jezebel. At last, hounded as he was mentally, and pursued as he was physically, by

Jezebel, he fled to a cave on Mount Horeb. As he lay in the quiet of that fastness a Still Small Voice spoke to him, and bade him fight on.

God has provided places where man may have the rest which it has been ordained that he shall and must have. If a map of any region is examined it will be seen that there are certain areas and localities which are, apparently, best suited to recreational purposes. As a general thing the soil in those places is very poor and unproductive. In many instances massive boulders have been thrown up in grotesque shapes, and it would appear that a Demiurge had become mad, and while in the heat of his rage he had thrown the rock about helter-skelter. In those places there are generally swift and turbulent streams that rush over cataracts and waterfalls. Wildlife abounds in profusion, unless man has killed it in his greed. A virgin forest may form a coat for the region. The leaves fall from the trees and mingle with wild flowers to form a carpet.

It may be that in one of those spots a tiny stream has worked for aeons of time to cut its way through the rock, and thus is left a canyon. And man come and marvel at the beauty. Or it may be that the Great Architect has gone underneath the surface of the earth and carved the subterranean formations into indescribable beauty, and that He has kept all of that sublimity hidden throughout the ages until the time comes when He thinks best to reveal its location to man.

The United States has been blessed with beauty spots so sublime that our citizens should feel as do the Mohammedans regarding a pilgrimage to Mecca, a trip must be made during one's life time. Mention might be made of that curious collection of rock, known as the Garden of the Gods, which is just outside Colorado Springs, Colorado. We might think of the beauties of Yellowstone National Park, Wyoming; of the giant redwood trees of California, and of the beautiful fir trees in Mount Rainier National Park, Washington. There is the Grand Canyon National Park, Arizona. One may turn east from the Canyon and go underground in Carlsbad Caverns National Park, New Mexico. No one can say that any one of these spots is the "most beautiful", for each is majestic and sublime. Man can only say that he has not adjectives to describe that which the eye hath beheld.

There are hundreds of people, however, who may never have the means with which to travel and see the great national parks of America. But God has not forgotten, nor has He slighted, those people, for in each locality, and usually at intervals of a very few miles, there are spots which it seems were created for recreational purposes, and to which those without script or purse may go for pleasure. The writer has in mind such local places as the Palo Duro Canyon State Park in Texas; and Beaver's Bend, Lake Murray, and Osage Hills State Parks,

in Oklahoma. There is indeed a spiritual refreshment to watch the people come to enjoy, and to rest in, these places.

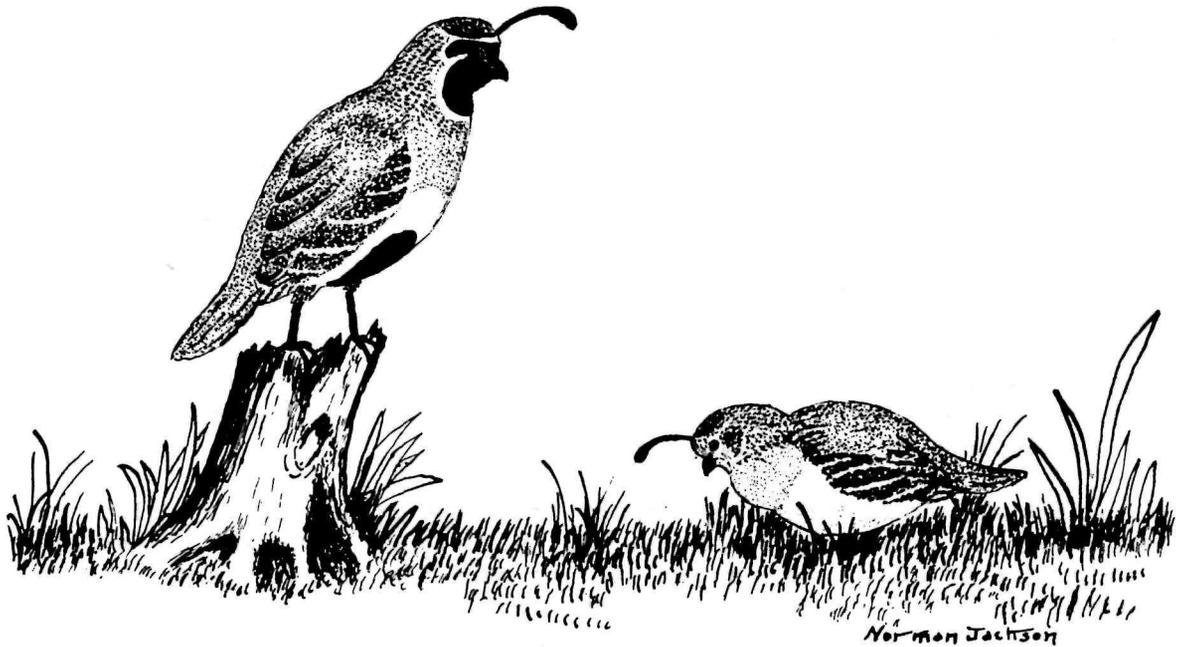
I would like to ask those who work with the National Park Service to have a spiritual attitude toward their work. Let them be justly proud of their accomplishments, not in the mere physical work which has been, and will be wrought, but in the spiritual aspect. Those who work to build our parks should feel, to use the words of Saint Paul, that they are co-laborers with God, and that they are helping to fulfill His divine purpose on earth. They should feel in their very souls that they are helping to create, and to maintain, places where man may rest, relax, and renew himself for the work of life. Let them feel that rest is necessary, and that God set the example, for we read that He rested after the work of creation.

ODDITIES

The Grand Canyon is "so much in the way" that ranchmen living in the Toroweap Valley section of Grand Canyon National Monument, adjoining the national park, must travel more than 500 miles to reach the county seat in Kingman, Arizona, which is less than 100 miles by air-line. One of these residents who lives in the south end of the valley, nearest the north rim of the canyon, has to detour through two other states to reach the courthouse of the Arizona county in which he lives. He must go north via Short Creek, Arizona, to Saint George, Utah, thence southwest to Las Vegas, Nevada, and over Boulder Dam to Kingman.

A rather common belief that some sense organ always enables bats in swift flight to avoid obstacles they can't see, was disproved in a series of night experiments in the Chisos Mountains area of the proposed Big Bend National Park, in Texas. Several fine wires were stretched across a large water tank frequented for drink. Many of the mammals struck the wires and fell into the water. All were rescued, uninjured.

Keeping your feet on the ground while you're up in the air is easy enough in Alaska's Mt. McKinley National Park, whose highest point - the nation's attic - pierces the clouds at an elevation of 20,300 feet above sea level. Loftiest of all North American peaks, McKinley, whose southern summit has been climbed by less than a dozen people, rises 17,000 feet above timber line. No other mountain in the world rises so far above its own base. The Indians call it Donali-home of the sun.



STATUS QUO OF QUINTUS QUAIL

By Earl Jackson,
Custodian,
Montezuma Castle National Monument.

Quintus looked approvingly at his reflection in the clear pool where he was taking his after sunrise drink of water. He bobbed his head pertly as he saw the handsome black-helmeted face under its jet plume as it gazed back, brighteyed, at him.

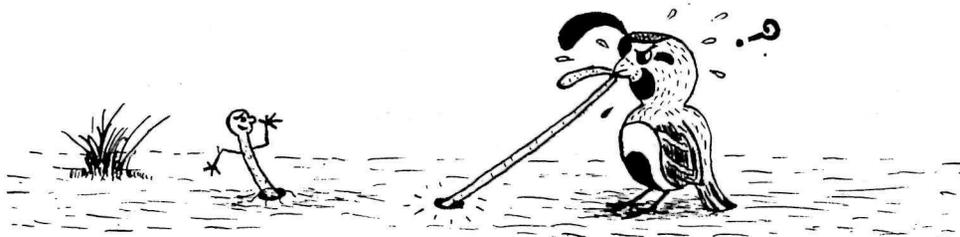
"Indeed I am quite a fellow." a mind reader might have registered. "Here I am, eight months' old, full grown and in the prime of young quailhood, able to lick any other saucy cock in the covey - except maybe Papa --" as he looked discreetly over his shoulder at the grizzled veteran who led the covey and fathered a good part of it. "And I could lick Papa - if I wanted to badly enough. Ho hum. Glorious day! Say, I like the looks of that girl ---!"

And so came the springtime of the year to Quintus, scion of an honored family in the Southwest. He was related to almost everybody of any consequence, it seemed. First were the other members of his own species, Gambel's Quail (Lophortyx gambeli gambeli Gambel), then the various other quail cousins, then the Bob Whites. A little farther along the family tree came the wily partridges and grouse, and finally the lordly turkeys. He wouldn't have cared much for the turkeys, had he known of the relationship, for they would have struck him as being high hat.

Of all these distinguished groups, however, Quintus' people came first in importance in Arizona and many other parts of the Southwest. For one thing they were the most numerous, and were found widely distributed in Southern Arizona, Southern New Mexico, Southeastern California, parts of Utah and Nevada, and all the way south into Sinaloa, Mexico. One reason they were so numerous was that they just naturally were family loving folks (Quintus was from just an ordinary sized family of 14 children). They were widely distributed because they could thrive in the hottest desert region and clear up into the pine country at a mile and more above sea level.

But why worry about the family tree on a spring day. Unless to make it grow some more! Quintus had just seen a girl who looked awfully nice to him. He hurried over to make her acquaintance, but it wasn't until the covey had left the water hole and was back up the bank under the shelter of the gaunt looking mesquite bushes, scratching for seed under some damp humus, that he was able to locate her again.

She was one of the children of that family which had joined the covey only yesterday. That was why he hadn't spied her before. For that matter, a week ago he wouldn't have noticed her anyway. That was February, and now it was March, the month in which quail of Central Arizona's valleys begin sending love notes. It was a warm day, so the covey remained active until nearly noon before taking a siesta, in a spot where the wind wouldn't ruffle their feathers, and where they could soak up the welcome sunshine and still be safe from marauders. During the morning Quintus dexterously edged around until he was in reach of the girl.



To you or me Quintessa would have looked just about like any other feminine quail. She was a plain little thing, very sombre hued by contrast with her admirer. But she had neat trim feet and legs, a compactly feathered and sturdily built body, and carried her prim little head very alertly atop that gracefully slender neck.

Quintus approached to her side and offered her a particularly nice looking mesquite bean he had found. She shyly ran away a few steps, scarcely looking at him, and went on leisurely eating. He came close again, neck carefully arched to just the right degree, plume drooping a bit closer to the ground. She gazed at him with slight interest, but seemed unworried about escape from his company. And so they came together often during the next few weeks.

On a day early in April Quintus decided he couldn't get along without Quintessa, and that if he didn't lay permanent claim to her company, somebody else would. For instance, he didn't like the way that fellow Braggar had been looking at her. His formal offer of marriage had none of the knee bending of Victorian romances, nor of the conciseness and brevity of modern swains, but was rather the stately gesture of a proud gentleman who offers what he knows is an honorable role to an equal. His sideward semi-circular prancing step in front of her said, "Lady of my heart, will you be my wife?" and when he spread the feathers of both wings and dragged the wing tips in the dust it said, "You couldn't make a better choice."

Quintessa looked gravely at him, and was about to answer, when she heard a flurry of motion a few feet away. And who should rapidly stride to her, right in front of the infuriated Quintus, but Braggar, that swaggering fellow who was never very far away! Quintus launched himself plummet-like at the intruder, and Braggar met him head on in a flutter of beating wings. There followed a battle royal, in which each contestant grimly strove to knock the other over, and make him retreat. Time and again they lunged at each other to stand chest to chest, each with his head over the other's shoulders. A casual glance might have misled an onlooker into thinking here was an exhibition of brotherly love, but a closer look would have revealed that these exhausted game cocks were trying, each on his own, to gouge with his sharp beak a hole in the other's back. Feathers flew, and blood stains spread onto their faces. Completely spent, they would rest a few seconds at a time, then withdraw to lunge again into that terrible test of nerve and strength.

Quintessa thought all this highly interesting, and she stood at ease, head half cocked to one side, admiring the proceedings, although from time to time she would lower her head to eat some pleasing tidbit. Although she had been Quintus' girl friend for several weeks, she placidly accepted the thought that she would be the wife of the winner,

whichever it was. And if Quintus lost, he might not find a wife at all that season.

The battle raged, between rest periods, for nearly half an hour, but at the end of that time, Braggar decided he had enough, so he beat a rapid retreat, leaving some of his back feathers. And Quintus sick, bloody, and weak, nearer dead than alive, returned to Quintessa. There was no question now about her. For as soon as he had rested she indicated, "Hadn't we better start looking for a house?"

They spent part of that day, and several more days of honeymoon, hunting about for a suitable nesting site, returning between times to visit with other members of the covey. After a few days, however, their friends were practically forgotten in the intensity of their search for a desirable location. At last they found the perfect spot. There was soft earth, surrounded on three sides by tall grass, underneath a spreading algerita bush which sent its upper branches into a huge mesquite.

Quintessa busily scratched away in the loose earth until she had dug a hollow about an inch and a half deep, six or seven inches across. Then began the task of nest building, a job which was to spread over several days. Quintus, while giving lots of moral support and occasionally carrying a twig, was about as useful on this job as a bull in a china closet. Quintessa did most of the work of selecting leaves, stems of grass, pieces of dried weeds and small sticks, and laid them into the loosely knit nest.

Finally the nest was finished, so that it slightly overlapped the edges of the hollow, and she patiently settled herself one day to prepare for motherhood. Quintus now knew what his job was to be. He set himself up as a committee of one to guard that nest, and spent the waiting hours in patrolling and feeding within a radius of 25 to 75 feet of the spot.



The eggs were of a buffy white color, spotted with irregular splotches of dark reddish brown markings, so perfectly camouflaged as to be almost invisible. Quintessa laid an egg a day for six days, and then evidently decided it was the Sabbath, for she rested one day. Then back to work she went for a five-day shift, a day of rest, and one final laying period which brought the egg total to sixteen.

One day a lean and wicked looking house cat came slinking toward the nest. Quintus' keen eyes caught sight of the intruder before it saw him, and he didn't waste any time. He darted to within about four feet of the enemy, so it would notice him, and then began edging away from the direction of the nest. The cat looked at him for a split second, made as if to pounce at him, but on seeing the bird move away, prepared to stalk its prey. Then Quintus went into an act. While moving away from the vicinity of the nest he staggered drunkenly along, one leg buckling under him every few steps, as though it was injured, while his wings did a dramatic and hopeless sort of fluttering. For a hundred feet and more he forced himself to hobble in this manner, just barely out of reach of the cat. Then he took to his wings and flew out of danger in a circular route. Two minutes later he was quietly walking back toward the nest from the opposite direction.

He arrived within calling distance just in time to hear Quintessa's low call informing him she was ready for her mid-morning rest and feeding period. He waited some distance from the nest while she stretched and fluffed her feathers before joining him. They fed together for over an hour before she returned to her eggs. That afternoon her feeding period lasted for nearly two hours, for the day was warm, and the eggs hold enough heat to prevent chilling.

While Quintessa was absent one afternoon, a large rat stole from his nearby burrow and carried off an egg to his den. He enjoyed his meal so much that he returned on the following day. Quintessa caught him halfway to his hole, and her furious beating wings and sharp beak caused him to drop his burden and flee. The egg was cracked, and she didn't know how to move it back to the nest, so while she returned to setting on the other eggs, the ants proceeded to enter the cracked egg and thoroughly clean out its contents. They were such voracious creatures that sometimes they were known to invade a nest, especially when chicks were beginning to hatch, killing them and occasionally even the mother.

Of the fourteen remaining eggs, the first one pipped on the morning of the 22nd day. And while we leave Papa to his lonesome sentry duty, and while Mama is half dozing, let's take a look at that first chick. He is in a tight spot, and he knows it. Squirm and wiggle as he will, he can make no headway in any direction. The place is as black as the inside of the proverbial black cat, and the air is not fit to breathe.

He begins with desperate violence to force the rough spot on the upper tip of his bill against the smooth hard wall around him. Soon the wall breaks through in a tiny spot. The youngster rests a few seconds, but he has the characteristic vigor of his kind, and soon gets busy forcing his way again, gradually turning his head and body

around as he does so. When he has cut a circle almost completely around the inside of the shell at its large end he shoves upward, and the top swings open like a door, still hinged by the soft inner membrane at one place. A few minutes later he sticks his head out. It is still quite dark, but now he can breathe easily, and so he loses no time clambering out of the shell. He scrambles restlessly over the other thirteen eggs until he approaches the edge of the nest, where he pokes his head through two of his mother's feathers for the first look at the light of day.

Thus a blessed event came to be. And others were not long in following. Things were happening thick and fast, for brothers and sisters were pipping shells rapidly now and popping their heads out in all directions, like popcorn in a skillet. Within two hours a dozen youngsters were hatched and were seething with energy. The other two eggs were pipped, but not hatched.

If a scientist had then happened by with a friend, and could have seen these newly hatched youngsters, thickly covered with down, with wings nearly feathered, he might have embarrassed Quintessa with his comment. He perhaps would have said to his friend, "Now here's an example of what I was talking about. Birds that are higher in the scale of evolution, such as crows, thrushes, and the like, are hatched nearly naked and almost entirely helpless. Those lower in the scale, such as quail, are ready to run as soon as they come out of the egg, and within a few days they start flapping their wings."

Quintessa, however, didn't hear any such comments, and so she peacefully took permanent leave of her nest, the twelve youngsters following. The two pipped eggs were left behind. A heartless proceeding, you think? But Nature's children must do that to survive. Even if she had waited for the two unhatched youngsters, they would have been weak and handicapped from the beginning, and would have fallen prey to enemies, besides hampering the progress of the others.

Quintus, like most fathers, had been more or less left out of the proceedings, but now he proudly followed the last of the toddlers. When Quintessa stopped to give the children a rest, he withdrew a short distance and perched in a bush where he could watch for possible enemies. His responsibilities were only started. His wife was the hub of a little universe now, and it took all her thoughts to teach and discipline the young. He was the guardian of them all. On familiar ground he would let Quintessa lead the way with the babies, but in strange or dangerous spots, he led the way himself.



Within two days the chicks were hungrily chasing insects, living almost entirely on a meat diet, although a little later they would expand their bill of fare to include green weed shoots and buds, parts of flowers, seeds, and tender leaves. The family moved around a lot, but never went any great distance. It was unlikely that any of them in a lifetime would move more than a mile or two away from the place of birth, unless disturbed by hunters.

Midsummer came, and the chicks were now easily able to fly to roost with their parents in the low thick hackberry trees along the creek bank. In the daytime they investigated everything. One became the victim of a wary rattlesnake which had missed the alert eyes of Quintus. And a Cooper Hawk darted from a low hiding spot one day as they went down to get water at the creek edge. Thus another youngster that was not quick enough to hide, lost his life.

While Quintus on many occasions saved the lives of members of his family, it was impossible to keep them all out of harm's way. This family was meeting the typical fate of the quail tribe. That's why so many youngsters were born. One night when the family was at roost in a hackberry, a house cat got into the tree. Quintus couldn't see a thing in the darkness, but as the cat grabbed him he awoke and let out his warning call, at the same time twisting loose from the tearing claws to fall to the ground, minus some feathers and some blood from torn flesh. The others scattered to earth in confusion, but not before the cat had one bird.

Late July found Quintus and Quintessa with nine husky adolescents on their hands, youngsters half grown and practically able to fend for themselves, except that they had a lot to learn. By now Quintus had as big a part in educating and disciplining them as had their mother.



It was about this time that one day they heard the plaintive crying of three little fellows who belonged to a neighbor's family. Some disaster had scattered the rest of their family, and they were lost. With characteristic generosity, Quintus and his wife adopted those waifs as their own, and they shared all the privileges of the other children. This generosity among quail has for many years caused people to have the mistaken belief that the birds raise two broods of young each year, simply because they had young of two different ages.

Through August the family lived in luxury. There were plenty of grasshoppers, and if there is anything a quail likes more than a few grasshoppers it is a larger supply of them. They ate more of these insects than any other, although a large variety of bugs fell prey to their appetites. Mosquito beans were also a highly desirable food item. The pods were too tough to tear open, but after animals had eaten them and the undigested beans had passed on, the quail found them to their taste.

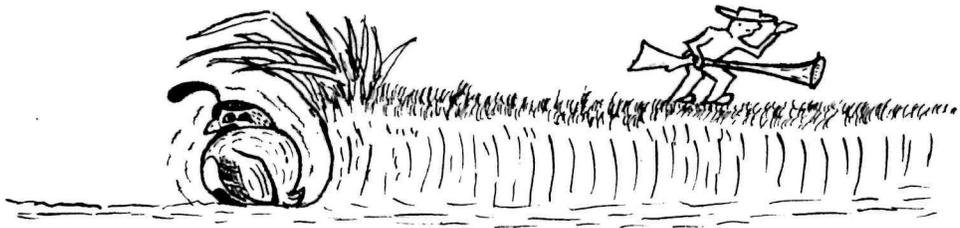
In mid September it would have required close study to figure out which were the parents and which the children, for the youngsters were full grown, and they thought they know more than their parents. This opinion was not shared by the elders, and stern disciplinary action was often necessary. Quintus was determined that he should wear the pants in his family as long as he was around. Yet, on the whole, they all got along pretty well together, and did a great deal of peaceful talking among themselves.

Quintus still stood guard a good part of the time while the family fed, and if a shadow of a hawk soared overhead he would issue his warning call, the extent of warning depending on the proximity of the menace. If he wasn't much alarmed, a few of the children would flutter or fly clumsily to protection, and the others would slowly straggle after them. But if there was real danger they didn't lose time in taking to wing.

You never saw more sociable folks than these quail. While they fed, there would appear to be no end of petty squabbling and bickering. But it was no more than the interchange usually noted in some feminine gatherings among the human species. And in the evenings, after they had leisurely made their way to roost, they would sometimes engage in exchanging comments, half of them talking at once, for a long time after dusk. You could never imagine how they found so many interesting things to discuss in those low voiced conversations, but anybody who has ever passed a quail roost in late evening is familiar with the sounds.

October faded into late autumn. The grasshoppers began dying off, and there was a lull between growing seasons. The family now had to

feed largely on seeds that had been left over from the summer, and so they did a great deal of scratching around in the litter under bushes, as chickens do. Life was very tranquil until suddenly one day quail season opened. A terror-filled two weeks followed. Quintus and Quintessa had been unable to inform the children of how to take care of themselves when confronted with the thunder of big shotguns, and the only recourse was added watchfulness. On several occasions, however, they were surprised, and two of the children fell with their bodies riddled with shot. A third bird, with a broken wing, was eaten by a coyote.



Quintus learned what it felt like to have a round ball of hot lead bury itself in his chest, and the fevered agony of tortured muscles around that irritation bothered him for many days. Finally, however, his body healed, although he would carry that lead shot as a reminder for the rest of his life.

Ultimately the hunting season was over. The cold dry weather of early December made it a hard job to find sufficient food at times, so the covey had to cover more and more ground each day to get enough to eat. In coldest weather the birds didn't spend as many hours feeding as they had earlier in the season, but they were also a little less active, hence used somewhat less body energy.

The end of the year brought rains and moisture-filled soil. Winter plants began popping their tender stems above the soil in the open sunny spots. When Quintus led his covey into the open spaces to feed on these delicious green shoots, he found other coveys had taken to the same idea. So there began a flocking of coveys, and a great deal of squabbling arose between heads of different families, for each cock wanted to rule the roost.

Quintus had to defend his prestige against other fathers on various occasions, so the result was he ran around with a sore back a good part of the time. As January and February rolled into early March the fifty odd birds, representing a half dozen coveys, began feeling the impulses that come with Spring. Rivalry started between the cocks.

Quintus didn't know he was a back number with the younger generation until one day, shortly before the time for the flock to begin

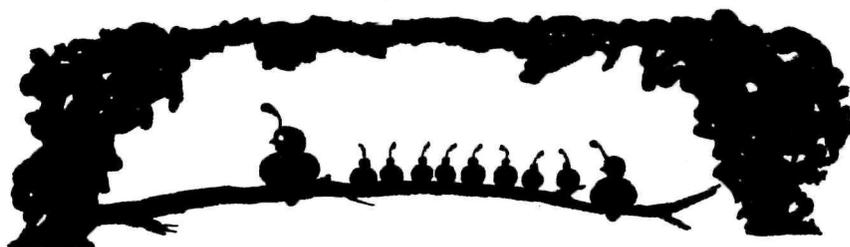
breaking up as birds began pairing off to hunt for nesting sites, he was feeding near to a young lady who was designated to cause heart palpitation among young swains. A sturdy young fellow, spying the two, decided Quintus was being too friendly to the apple of his eye, and came hurriedly over to discourage the acquaintance.

Quintus, out of habit, administered a disciplinary peck at the head of the young cock, expecting the youngster to back away. He did - about two steps, and then launched himself headlong at Quintus. And Quintus, startled, recognized one of his own boys! He was almost completely bowled over by that first rush, but then recovered his equilibrium and parental wrath at such disrespect, and dived into the fray. It didn't take him more than a minute to realize that here was a foe-man worthy of his mettle. He would not have gambled on the outcome, although he had never been beaten. Possible embarrassment was saved for him by the timely shadow of a circling raven, which caused a general retreat to the shelter of the bushes and an end to the hostilities.

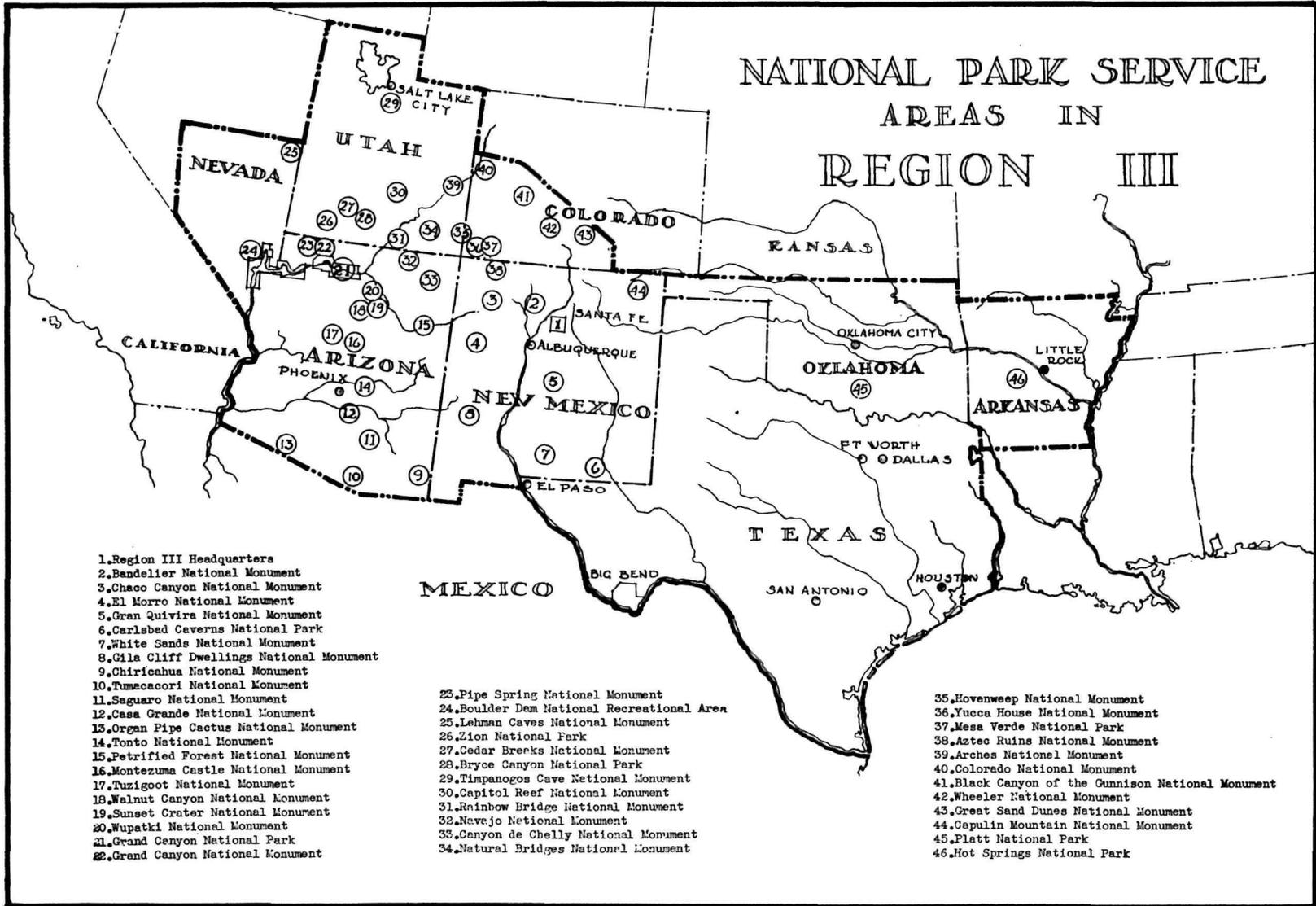
A few moments later Quintus saw the impetuous youngster happily showing some choice seeds to the young lady who had been the subject of the argument. Somehow he felt a little old, as he perched on a rock to survey the flock. He thought, "I must be getting old, when my own boys decide to put the old man on the shelf. Guess I'm a has-been." That was a terrible thought. "No, by heck! I'll show 'em! I'll raise another family, I will! Bigger than the last one!"

He dashed off at once to find Quintessa. She was never far away. She was so used to being bossed by him that she just naturally stayed fairly close. He burst out without delay into rapid talk. "Come, Quintessa, it is time for us to look for a nest. Hurry!" She cocked her head to one side and looked at him. "Dear Me, Quintus. Must it be so soon? Haven't you forgotten something?" He was taken aback. "Forgotten what?" She was very demure. Quintus realized he had almost forgotten how attractive she was. "Well---I ---- there was a time ----. You know, I just love a nice fat mesquite bean once in a while, or a choice beetle --. You must give a girl a chance to make up her mind."

Quintus was dumfounded. But it didn't take him long to get the point. And so he dashed off into the bushes to hunt for the tenderest, juiciest morsel he could find, with which to tempt the lady fair.



NATIONAL PARK SERVICE AREAS IN REGION III



- 1. Region III Headquarters
- 2. Bandelier National Monument
- 3. Chaco Canyon National Monument
- 4. El Morro National Monument
- 5. Gran Quivira National Monument
- 6. Carlsbad Caverns National Park
- 7. White Sands National Monument
- 8. Gila Cliff Dwellings National Monument
- 9. Chiricahua National Monument
- 10. Tumacacori National Monument
- 11. Saguaro National Monument
- 12. Casa Grande National Monument
- 13. Organ Pipe Cactus National Monument
- 14. Tonto National Monument
- 15. Petrified Forest National Monument
- 16. Montezuma Castle National Monument
- 17. Tuzigoot National Monument
- 18. Walnut Canyon National Monument
- 19. Sunset Crater National Monument
- 20. Wupatki National Monument
- 21. Grand Canyon National Park
- 22. Grand Canyon National Monument

- 23. Pipe Spring National Monument
- 24. Boulder Dam National Recreational Area
- 25. Lehman Caves National Monument
- 26. Zion National Park
- 27. Cedar Breaks National Monument
- 28. Bryce Canyon National Park
- 29. Timpanogos Cave National Monument
- 30. Capitol Reef National Monument
- 31. Rainbow Bridge National Monument
- 32. Navajo National Monument
- 33. Canyon de Chelly National Monument
- 34. Natural Bridges National Monument

- 35. Hovenweep National Monument
- 36. Yucca House National Monument
- 37. Mesa Verde National Park
- 38. Aztec Ruins National Monument
- 39. Arches National Monument
- 40. Colorado National Monument
- 41. Black Canyon of the Gunnison National Monument
- 42. Wheeler National Monument
- 43. Great Sand Dunes National Monument
- 44. Capulin Mountain National Monument
- 45. Flatt National Park
- 46. Hot Springs National Park

