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THE COVER

Giant Dome, in Carlsbad Caverns National Park, New Mexico. This huge stalagmite is 62 feet high, and 16 feet in diameter. It is estimated to be 60 million years' old.

C O N T E N T S

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Santa Fe — New Mexico

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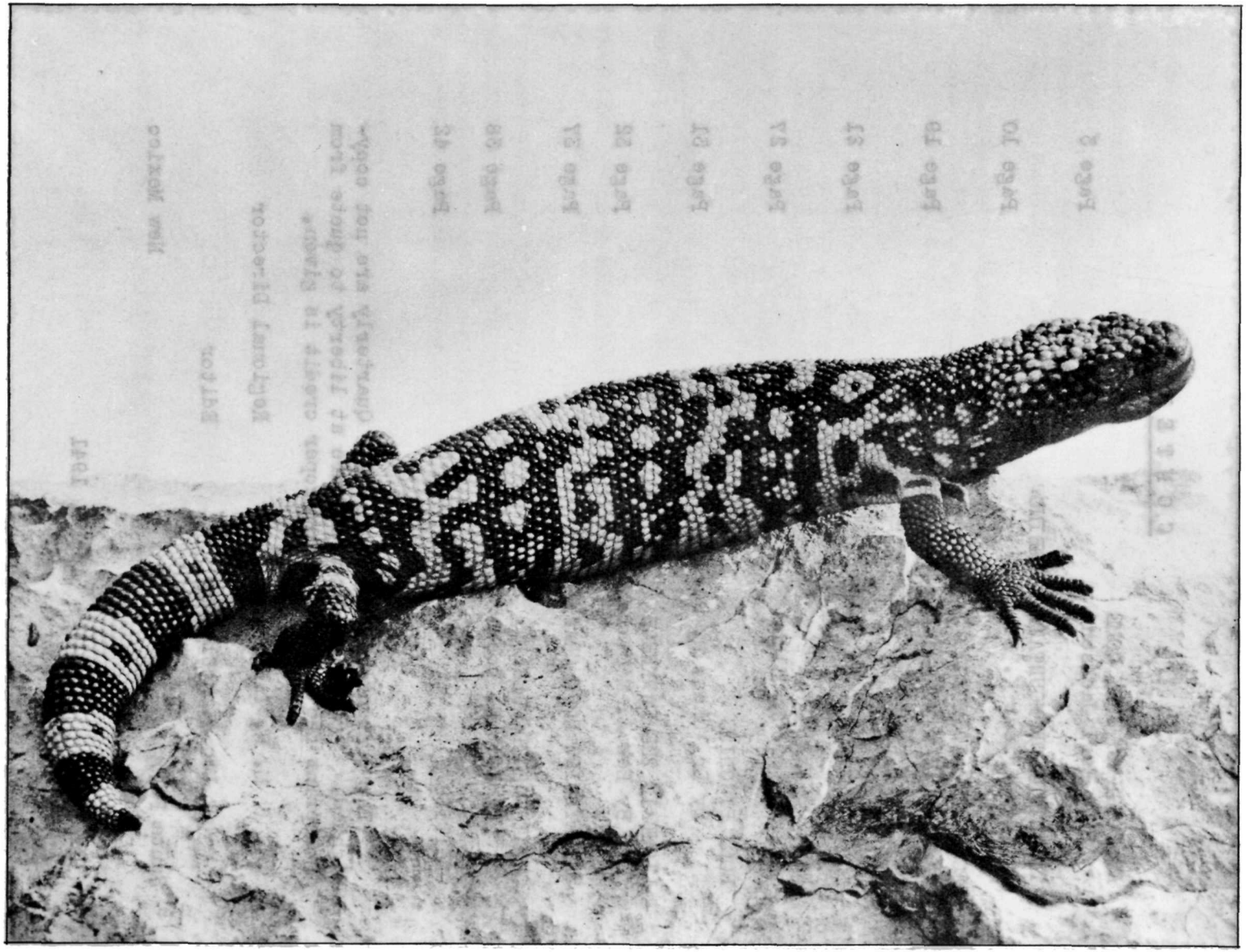
R E G I O N III

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



ARIZONA GILA MONSTER

A. W. Carson Photo
Flagstaff, Arizona

AS TOUGH AS THEY COME

By Earl Jackson,
Custodian,
Montezuma Castle National Monument.

Of all the wild creatures that live in the United States, there is none more completely shrouded in ignorance and superstition than the Gila Monster (Heloderma suspectum). For this he has largely to thank his secretive habits, his ugly and fearsome appearance, and the fact that he belongs to that universally feared group, the reptiles. If you would care to investigate with me some of the fact and fancy connected with these animals, perhaps together we can erase some of these erroneous beliefs.

The Gila Monster belongs to the lizard family known as Helodermatidae. This family is very significant, for it contains the only poisonous lizards to be found on the face of the earth. It has only one genus, Heloderma, and two species, Suspectum and Horridum. Suspectum is the only poisonous lizard occurring in the United States, and derives part of its popular name from the fact that its principal range is along the Gila River of southern Arizona and its tributaries. It is essentially a creature of the desert, rarely found above 4,000 feet altitude, although the range extends from northern Sonora to as far as southeastern Nevada and southwestern Utah, and from southwestern New Mexico on the east to the California line on the west.

Heloderma horridum, the "Boaded Monster" of Mexico, is a semi-tropical creature, living principally along the Pacific Coast from Sinaloa in the north to the peninsula of Tehuantepec in the south, being quite abundant in this range. It also extends into central Mexico and southward to the northern states of Central America. Oddly enough, while the two lizards are very similar in structure and habits, they are separated by a wide area of land in which neither is found.

The Gila Monster has a very stocky body and a heavy club-like tail. An adult averages between 16 and 19 inches long, although occasionally they reach 22 inches, and rarely 24. The head is massive, flat on top, and shaped somewhat like a triangle with a little of the front tip cut off to make a blunt end. Bulging jaw muscles behind the eyes add extra width. The front part of the head is purplish brown to black, as are the feet and the lower parts of the legs. The rest of the body is made up of this same color varied with irregular rings and blotches shading anywhere from a creamy white to a reddish orange. In some cases the dark predominates; in others, the lighter color. The markings, while quite irregular, tend toward the tail to become fairly clear transverse bands. The markings continue underneath the body, although here they are less complex. After the shedding of skin, which occurs at different times through the year, the pattern is fresher looking than at other times. The lizard is sometimes called

"an animated bead bag", for it is covered on the top and sides with raised tubercles, or beads. The scales of the under body by contrast are true scales; they are quite smooth and square, and touch each other, overlapping slightly.

Heloderma horridum, the Gila Monster's Mexican relative, commonly called "El Escorpion", averages a little larger in size. A normal adult will be slightly over 20 inches long, an unusual one, 24 inches. A rare one is sometimes recorded nearly 30 inches long. Horridum is built the same as Suspectum, but the body color is a little different. The head is usually entirely black or dark brown, and this color predominates over the rest of the body, some specimens being almost entirely black. The contrasting color blotches are a rich yellow.

The Gila Monster has stocky and powerful legs and feet, with strong sharp claws, which it uses occasionally to climb into low bushes and up steep places, the heavy tail being used as a support. The feet are interesting, for their internal structure is almost exactly like that of the human hand, having the same number of bones, with a similar arrangement and shape. When you meet the reptile in his native state, it is easy to understand how his weird shape and coloring, and the vicious looking head, make him an awesome sight. As he walks over the desert with long and deliberate steps, which throw the body into graceful flowing curves, the large black tongue darts frequently in and out. This wicked looking forked tongue adds to the fear-inspiring picture, although it is completely harmless. When the creature is annoyed or disturbed he is apt to lift his head slowly and open his mouth to a menacing attitude. Then he makes an impressive blowing noise, accomplished by forcefully ejecting bursts of air from his lungs.

The monster looks tough, and he is tough. I received a freshly killed specimen and proceeded to inject it hypodermically with an alcoholic preservative. Imagine my surprise when I found it almost impossible to force the sharp needle point through the skin! It is no wonder the lizard is safe from sharp thorns and cactus spines. The tenacity to life is so remarkable that it is extremely difficult to kill one. The tough skin, the heavy build, and the fat insulation, all work for its protection. But, like other reptiles, it will soon die if left in the direct sunlight of a hot summer day. The body has no heat regulating mechanism, hence its temperature is within a degree or two of the environment. When you think that a fever of 10 degrees will kill a human, you can imagine what happens to a reptile on sun-baked earth when the thermometer even in the shade hovers at 110 or 115 degrees.

One of the remarkable features about the monster is the heavy musculature in the jaws and mouth. These powerful jaw muscles, combined with a bulldog disposition to hold on, mean that when he grabs hold of something in anger it is very difficult to get free. He bites

with such vigor that even if the body is severed from the head, the set jaws retain their grip. Dave Gorsuch, in the Arizona Magazine for June, 1937, described the case of a small dog which suffered a broken foreleg as the result of an encounter with a Gila Monster. While the bite was probably not strong enough to crush the bone, the struggles of the dog for freedom from the vise-like grip broke the leg. In contrast with jaw and mouth muscles come very inadequate muscles for the throat, which is literally just a wide hollow tube. The throat has so little muscle tissue that the lizard has to raise his head and swallow mainly by gravity. If a specimen which has just fed is picked up by the tail and hung head downward, the food falls out.

It is well known that Mother Nature is a bit capricious in running her desert cafeteria. Sometimes there is plenty of food, and at other times there is scarcely a thing to be found. The monster is prepared for these variable spells. When food is ample he eats prodigiously, converting it into fat which he stores in his tail. When food is scarce, he can live for many months on this accumulated energy. Slow metabolism is, then, a secret to successful life on the desert. You can immediately spot a well fed individual by the girth of his tail, or a poorly fed or sickly one by the reduced diameter of it.

Two common misunderstandings about Gila Monsters can be readily dismissed. One is that the creature has no anal opening, and therefore is poisonous because of accumulation of decaying waste in the system. The other is that the breath is poisonous. The reptile has a perfectly normal reptilian alimentary canal and anal opening, as dissection and observations have established beyond the shadow of any doubt. The breath, while disagreeable and fetid, is certainly not more dangerous than the exhalation from the mouth of any creature which will eat spoiled or rotten food. Part of the halitosis might be traced to the appetite for eggs, no matter how ripe.

In scanning the life cycle of the Gila Monster one finds there are gaps in the story. This means that more research is necessary before we can speak with confidence about all their habits. Nesting traits, however, are pretty well known. In southern Arizona the female usually hunts a nest location in the latter part of July. She finds a moist sandy area, preferably near a stream; it must have a sunny exposure, so that the sand will be warmed by the sun's heat. If the sand is too dry the eggs won't hatch; if it is too damp, they spoil. She digs a hole four or five inches deep, and lays six to ten eggs at varying intervals. This done, she scrapes the sand back into the hole, entirely covering it, and then goes away and forgets the place.

The eggs when laid are about two and one-half inches long, and contain small but well-formed embryos. The shell is a white oval with a rough surface, thin and soft, but not fragile. After 28 to 30 days of incubation the three and one-half inch youngsters dig their way to

the surface, where they greet the light of day fully equipped, even to pugnacious disposition, to fend for themselves. They are skinny creatures, unlike the well fed parent, but have their permanent coloration. The young monsters have prodigious appetites, but grow slowly. O. M. Arrington, Tucson, Arizona, authority, finds that at the end of a year one is still skinny and underweight, not over six and one-half inches long and weighing less than an ounce and one-half. This is in contrast to the average adult weight of 20 ounces. It was impossible to learn from the available literature just when the lizard reaches sexual maturity. If it is like many other large reptiles in this respect, the female would lay in the summer of her third year. Also, more by inference than anything else, I feel certain that mating occurs early in the season, in March or early April. Scanty evidence suggests that they mate and forget each other.

The monsters are seen most frequently in the spring, when they are quite active hunting mates and food. With the hot weather of May and the following summer months they are rarely seen in sunlight. They hide in shaded spots during the heat of day, and prowl at night. The casual observer sometimes concludes, because they are seldom seen in summer, that they aestivate during the hot dry season. However, a herpetologist can find the reptiles all year, except in late autumn and winter. He knows their hot weather preference for evening and night hours, and that even at best they are hard to see in their native habitat, so he chooses his hunting hours when most people are at supper or in bed. Howard K. Gloyd, Director of the Museum, Chicago Academy of Sciences, was able to collect a few in July, August, and early September. He obtained them in late evening after sundown. Two were captured just after a heavy thunder shower.

Little is known about the natural foods of Gila Monsters. In captivity they prefer eggs to anything else, but will eat them mixed with chopped meat or corn meal. One will push an unbroken egg against a corner until it cracks, then push the smooth tip of the tongue inside and lap up the contents. A hungry individual may eat three or four chicken eggs at a meal. Charles T. Vorhies, Economic Zoologist, University of Arizona, found that one will occasionally swallow a freshly dead mouse if the mouse is placed in the jaws. He found an unidentified small furry mammal in the stomach of one. Another specimen was reported to him as containing three newly born jackrabbits.

On two occasions, Mr. Arrington, the Tucson authority, saw the reptiles gorging themselves on eggs from quail nests. He states that experimental attempts to feed them on a variety of insects met with failure. His belief is that normally they eat a few small animals, but mainly the eggs of other reptiles and ground birds. Their taste for water should not be overlooked. They like it, although they are awkward about taking it. They have to drink by inserting the nose in the fluid, then raising the head to allow the water to slide down the throat. In closing the comment about food, we owe the monster an ex-

planation. In no sense is his taste for quail eggs a major menace to the birds. At best, the reptile is not numerous, and in the long run he takes only a small percentage of the eggs. He is simply one of the many predators which keep the quail population stable. Kill off such predators, and the prolific quail would abound in such numbers they would starve.

Perhaps the most controversial point about the Gila Monster is that of whether he is poisonous, and if so, to what extent. To answer this question let us first take a brief anatomical look at the mouth. It is equipped with both upper and lower sets of teeth, all of which are grooved, both in front and in back. The front groove is the deeper, and is formed by projecting folds of enamel. The teeth, when extracted and dried, are found to be hollow inside, but there is no means for poison to be conveyed within them. All the teeth are rather small and fragile, being easily broken. While the mature teeth are fastened to the bone, the young teeth are free and easily detachable. Teeth are shed periodically, and replacements occur in the fairly wide spaces between the other teeth. The four anterior teeth of each side, both upper and lower, are larger than the others, deeper grooved, and slightly longer, with faintly back curving tips. They protrude above the gums a little more than an eighth of an inch. In biting, the monster frequently leaves no tooth wounds, or if present, they may be very slight. This is because several of the fragile teeth may be broken off as the powerful jaws clamp together on the victim, and because some may be absent due to shedding.

The Gila Monster quite definitely produces a poison. It can be separated and dried into crystals which look much like those of dried rattlesnake venom. As a venom producing creature, however, he is rather low in the scale of evolution. Herpetologists point out that originally there were no poisonous reptiles. Gradually the saliva of some of them began to secrete mildly poisonous elements, until eventually in many cases a specialized function of part of the saliva glands became that of venom production. This development continued until, as in the rattlesnakes, the poison glands became quite separate and distinct from those which continued to make saliva. On the other hand, the monster still secretes poison more or less as a sideline in a saliva gland. As another case in point, his shallowly grooved teeth represent but a beginning of what, in the rattlesnake, became a tooth in which the groove folded over and closed, leaving a hollow fang like a hypodermic needle. Also, the monster lacks a direct connection between the gland and the tooth, whereas the rattlesnake poison sac attaches by a duct to the base of the fang.

The monster produces its venom from two large glands, one on each side of the lower jaw or mandible. Each gland is divided into four primary subdivisions or lobes, which increase in size from front to back. Each lobe is a structurally independent organ, and opens by a separate canal or duct leading through the wide mandibular bone to

terminate between the anterior teeth and the lip. Each of these lower teeth is like a flower in a pot. It stands by itself, its base completely surrounded by a cup-shaped fold of mucous membrane. Immediately external to the cup is a shallow groove, limited at the outer side by a prominent fold of mucous membrane intervening between lip and lower jaw. This groove is divided into a series of shallow depressions by transverse bands of tissue which connect its outer membrane border with the jaw, attaching between the teeth. The ducts of the glands open into the more anterior of these shallow depressions. The depressions undoubtedly serve as temporary reservoirs for the secretion, and the tips of the upper teeth fit into them when the mouth is closed. So we find, in short, that the poison producing glands, located only in the lower jaw, each have four separate and distinct openings which release poison-carrying saliva not directly into or against the four front teeth on each lower side, but in pools near them.

A review of the literature that has been written on Gila Monsters during the past 58 years reveals considerable difference of opinion about their danger to man. So far as I am able to determine, published case records of bites fail, in any single instance, to show the bite as the direct primary cause of death. Most authorities admit, however, that a sufficiently large injection of the poison might kill a healthy adult. That no such person has reportedly died from the venom might be explained by stating several variable factors: (1) Frequently the reptile has few or no teeth at the time of biting, hence could open no avenue for the poison to enter the system. (2) The teeth are short, securing little penetration at best. (3) The open groove is a very inefficient venom carrier. (4) Sometimes only the upper teeth penetrate the flesh, and since they carry only the poison which adheres to them from contact with saliva from the lower jaw, little can enter the wound. (5) Even the lower teeth have no direct connection with the poison carrying ducts. (6) Poison is usually highly diluted with saliva by the time entry is effected. (7) Age, size, and condition of the reptile determine its quantity of venom. Some specimens would have comparatively little.

It should be further pointed out that in many cases of painful and serious bite the poison may have played a lesser role than was imagined, because: (1) the nature of the reptile, once it bites a victim, is to clamp its very powerful jaws as tightly as it can and then, without loosening its grip, to lacerate the flesh with a sub-biting motion. So you get the natural bruising effect and shock from a powerful animal's bite, as well as torn flesh. (2) Since the mouth of the creature is a filthy germ-laden space, and since lacerated flesh is a perfect spot for infection, serious contamination can enter the wound and combine with even a small amount of venom to produce possibly disastrous results.

In short, we are wise to consider the Gila Monster as a dangerously poisonous reptile. In all cases of bite, one should completely

sterilize the wound as promptly as he can, and in serious cases use a tourniquet and the incision and suction method as prescribed in first aid treatment of snake bite. Fortunately, the monster is usually so placid he doesn't get mad enough to bite. But when one is seemingly tranquil and lying quite motionless, especially if he has been teased, liberties should not be taken with him. If you reach a hand close to him he can swing his head like lightning to one side to seize the hand. A sorely aggravated individual can pivot his whole forebody on his hind legs for a quick lunge.

Man is about the only creature the reptile has to fear. Even the rattlesnake has no terror for him. The Tucson authority, Mr. Arrington, describes what happens when one is placed in a cage with a rattler. The snake acts afraid, and crawls off to the other side of the cage. The monster follows in a menacing attitude, and when within striking range makes a quick sideward thrust of its head to imprison the snake's body in its jaws. Characteristically, it hangs on like a bulldog. The snake writhes and lunges, seldom attempting to strike. Striking does no good anyway, for the fangs can't penetrate the tough hide. In three to five minutes the snake is usually dead. You can't help having a lot of respect for our tough skinned neighbor of the desert, but you have nothing to fear from him if you let him alone. Like some people, he is a bad one to "monkey" with, but a good one to get along with.

When you suddenly encounter a Gila Monster in his native haunts, and he looks at you in surprise for a moment before deciding to retreat, his bearing is that of a king. With his nearly black head reared well above the rest of his mottled body, and his broad chest elevated above the ground on wide spaced and sturdy legs, you find his pose has suggested to you, not that of a "cold and crawly" creature, but that of one of Nature's noblest animals, the African lion.

TECHNIQUE OF MOUNTAIN CLIMBING

By Ernest K. Field,
Park Ranger,
Rocky Mountain National Park.

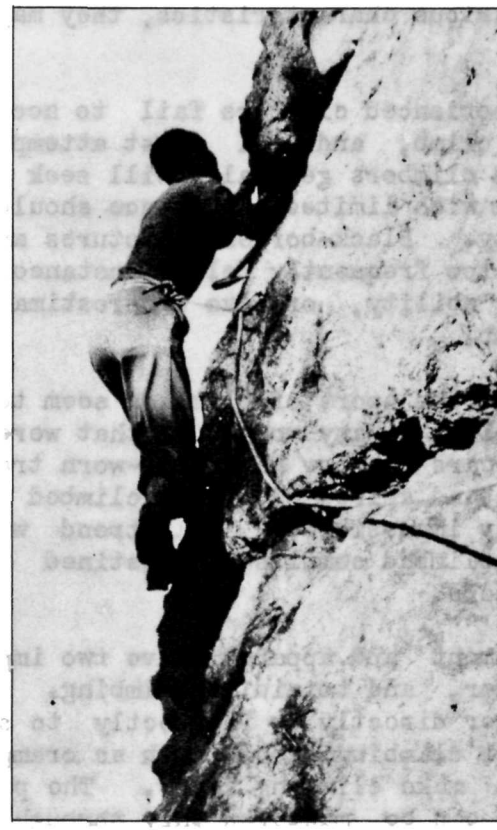
Since that day in the dim past when the first man went out of his way to climb his first mountain, this question has arisen to harass climbers the world over: "Why do you climb mountains?" It is a question which rarely passes between two climbers, but which is invariably asked by one who has never climbed. It has a multitude of answers, any two of which seldom are exact, and all of which fail to convince the inquirer as to just why we do climb mountains.

A climber knows why he likes to climb but seldom will he, or can he, explain. Perhaps he will say he climbs for the exercise, or for the view from the summit, or -- well, just because he likes to climb. Why do climbers suffer great hardship and discomfort in an endeavor to attain, for example, the summit of the highest mountain in the world, Mount Everest, in India? Surely not for the exercise, or the view. For the honor? Perhaps, but no climber will say so. In fact, he will seldom say anything, but he knows that the summit represents a challenge to his strength and prowess, and that by reaching it he will have answered that challenge and will have gained a deep feeling of achievement and gratification that has yet to be adequately described.

This psychology holds true not only for the highest mountain in the world, but for every climb. The more difficult the climb, the more intense the challenge; and the more intense the challenge, the greater the thrill when the summit is gained.

Climbers may be divided into two general groups: those who "walk" up mountains, and those who "climb" mountains. Some of our mountains offer no "climb", yet may be "walked" up from any approach; some may only be attained through more or less serious climbing; and of course there are many that have numerous combinations of both walks and climbs.

"Walkers" generally seek the most feasible and perhaps the easiest route in ascending a mountain, while "climbers" reconnoiter for a route that presents the maximum intricacy within their capabilities. For this reason a rugged peak in a climbing area soon becomes known as being "complex", as new routes are pioneered up its sides. As each new route is climbed for the first time it opens other variations of the same route until the peak presents climbs with every degree of difficulty. A peak of this type then becomes an excellent training ground for neophytic climbers, for as their degree of proficiency and technique advances with each climb of increasing difficulty, they may attempt other more intricate routes until they have made all of the accepted climbs. Then, since they now have a thorough knowledge of



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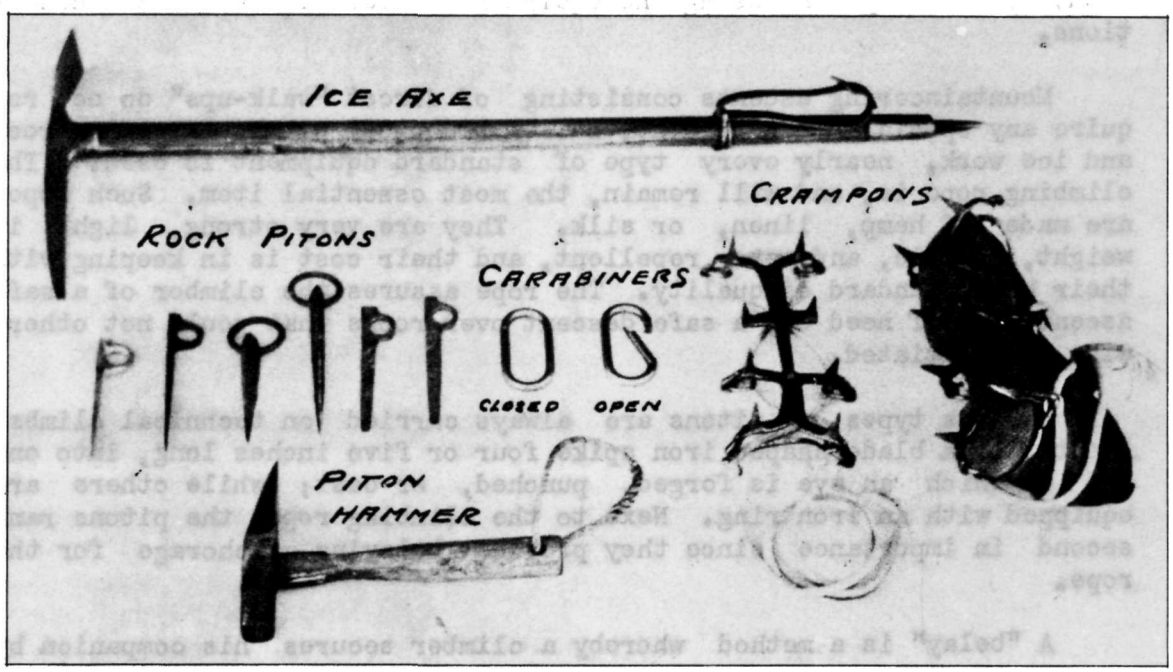


CLIMBING EQUIPMENT

the peak and its various characteristics, they may do a bit of pioneering themselves.

Too many inexperienced climbers fail to accord the proper respect to the peak they climb, and will first attempt the most difficult route. Experienced climbers generally will seek out the more difficult routes, but climbers with limited experience should never attempt climbs beyond their ability. Black-bordered pictures and terse paragraphs in climbing journals too frequently relate instances where climbers have overestimated their ability, or have underestimated the degree of difficulty of the climb.

Participants in the sport of climbing seem to be increasing, both in numbers and ability. Many mountains that were classified as inaccessible not many years ago now have well-worn trails to their summits. Sheer walls, peaks, and spires have been climbed that a decade ago were branded as "utterly impossible." This trend would seem to indicate that all of our unclimbed summits are destined eventually to show the scrape of nailed boots.

Climbing equipment and apparel have two important purposes: to safeguard the climber, and to aid in climbing. Most equipment, however, is used either directly or indirectly to safeguard the climber. For example, direct climbing aids, such as crampons and ice axes, by nature of their use make climbing safer. The proper use of equipment is a technique that can be mastered only through experience. Certain fundamentals may be learned by studying articles concerning the use of equipment, but the essentials of this technique are acquired only by actually handling and using the equipment under all kinds of conditions.

Mountaineering ascents consisting of direct "walk-ups" do not require any specialized equipment, but on technical climbs involving rock and ice work, nearly every type of standard equipment is used. The climbing rope is, and will remain, the most essential item. Such ropes are made of hemp, linen, or silk. They are very strong, light in weight, pliable, and water repellent, and their cost is in keeping with their high standard of quality. The rope assures the climber of a safe ascent, and if need be, a safe descent over rocks that could not otherwise be negotiated.

Various types of pitons are always carried on technical climbs. A piton is a blade-shaped iron spike four or five inches long, into one end of which an eye is forged, punched, or cast; while others are equipped with an iron ring. Next to the climbing rope, the pitons rank second in importance since they provide belaying anchorage for the rope.

A "belay" is a method whereby a climber secures his companion by

snubbing the rope that passes between them. This is done by running the rope over a point of rock or through a steel ring that has been snapped into the eye of a piton which has been firmly driven into a crack in the rock. Quite often climbers use "shoulder belays" to secure the ascent of the person below them. This is accomplished by the climber obtaining a good stance on an adequate foothold and passing the rope that leads to the climber below him, under one arm, across his back, and over the shoulder. His grasp on the rope, in addition to the friction provided as the rope passes across his shoulder is then sufficient to support the ascending climber, if the latter slips.

Climbing parties should be made up of not more than three persons on any one standard climbing rope of 120 feet in length, as under normal conditions no less than 50 feet of rope should be provided between each climber. The most experienced climber should assume the responsibilities of the leader and be first on the rope; the climber ranking second in ability should be next on the rope to insure the proper belaying technique for the leader. The climber with the least experience should be last on the rope. The above placement is for a party of three. The leader and the end man tie their respective ends of the rope around their waists with bowline knots, and the middle man ties into the middle of the rope with a simple overhand knot tied into a loop of the rope. Thus the three are tied together on the same rope. If the rope is long enough to accomodate more than three climbers, still allowing at least 50 feet of rope between them, it is a good policy to place the climber with the least experience or ability between two experienced climbers. Quite often a member of the party is especially proficient in a certain phase of climbing, and takes over the lead when his particular specialty is encountered. As the leader advances up a difficult pitch, the second man will constantly watch his movements, feed out the proper amount of rope as needed, never allowing it to become too tight or too loose, and provide the proper belay. In this manner, if the leader slips, the second man will be ready to "catch" his fall.

The ability to "catch" a climber's fall is an art. As the climber falls, the rope should be taken up as rapidly as possible, but when the climber reaches the end of his fall the second man should reduce the jolt to the leader, and also reduce the strain on the rope and belay, by the proper manipulation of his weight. All this has to be done in two or three seconds. It may be seen that the leader would fall nearly twice the length of that amount of rope that is between himself and the second man. For this reason, the leader places pitons at strategic points as he climbs. The piton is driven into a crack in the rock with the piton hammer, and a carabiner (an oval or pear-shaped steel ring equipped with a spring snap) is snapped into the eye or ring of the piton. The rope is then snapped into the carabiner. If the leader fell within the next few feet of climb, he would not come hurtling down past the second man, but merely dangle from the piton, firmly anchored by the belay of the second man.

If the leader places his pitons wisely, almost any pitch, however difficult, may be climbed with reasonable safety. As soon as the leader reaches a secure stance at a location large enough to accomodate another climber, or just above such a place, he will tell the second man to start climbing, and will secure him as he climbs with a shoulder belay or another piton, keeping the rope free from slack. As the second man reaches the pitons and carabiners placed by the leader, he unsnaps the rope from the carabiners and generally snaps the rope into the carabiner behind him so that he may be secured by the man below, as well as by the leader. The last man will unsnap the carabiners from the pitons as he reaches them, and if possible he will also recover all the pitons. Frequently a piton is impossible to remove, but the policy is to remove as many as possible. If the leador of the party drives a piton, he knows how well it is driven and how much strain it will stand. When a piton is left in the rock there is a possibility that another party of climbers may pass over the same route and use the same piton, not knowing how secure it may be. In the interests of safety, a piton of unknown origin or age in an important spot should be left alone, insofar as possible.

It will be readily seen that climbing and rope technique cannot be learned from books. Only by experience can a climber attain that degree of coordination and cooperation essential to safe climbing. If, for example, the second man fails to catch the fall of the leader, the weight of the fall could very easily pull him from the rock, and their combined weights continue to jerk off the rest of the climbers.

Ice technique, involving the ascent or traverse of steep ice fields, calls for three specialized items of equipment in addition to the climbing ropes. These are the ice axe, crampons, and ice pitons. The ice axe is made along the same general design of a pick mattock, only, of course, much lighter in weight, smaller, and of finely tempered steel. Its hickory handle is about 34 inches in length, with a steel spike and ferrule at one extremity, and on the other a steel head, one end of which is pick-shaped and the other end chisel-shaped. It is used to cut steps in ice, provide a belay for the rope that is looped around the shaft which has been plunged handle first into the snow, and to provide security for the climber through hand use. Crampons are steel spikes that are strapped to the soles of the boots to provide better footing for the climber on snow or ice. It is sometimes difficult to overcome the tendency to walk on the ball of the foot or on the toes when using crampons on steep slopes, but the crampons should always be placed flat on the ice so that all the spikes engage. Ice pitons are longer than rock pitons, and generally have serrated edges and a ring fixed in one end. These are driven into the ice and used to provide a belay for the climbing rope which safeguards the climber.

The fundamentals of ice climbing are the same as for rock climbing. Only one properly belayed climber should move at any one time,

and in addition to being constantly on the lookout for falling rocks which have a habit of converging in ice filled gullies, ice climbers should plan their climb both as to time of day and location so that the danger from snow avalanches is minimized.

In a discussion of apparel, the climbing boot takes the spotlight. The two general types of boots are nailed boots and soft-soled boots. There are a number of kinds of nails, most of which are similar in that they are placed around the edge of the boot to provide footing in minute footholds. Other smaller nails are placed in the center of the sole. Some edging nails are made of soft iron, while others are made of hard steel. When a boot equipped with soft nails is placed on a foothold, the tiny particles of quartz, or other hard rock penetrate the iron, causing a "non-skid" traction. Steel nails tend to dig into the rock with equally good holding ability. The nailed boot is a very popular all-purpose boot since it will hold well on either wet or dry rock and provides good footing in snow or ice. Some climbing boots have soles made of rubber or rope. These are superior to nailed boots on dry rock, and because of their light weight they are often carried by climbers for use when conditions permit. Felt-soled boots or slippers are sometimes worn on very wet and slippery rock.

Climbing trousers must be full cut to eliminate binding, and must be made of a sturdy material. They should be cuffless, or of the knicker variety so that there is no danger of the climber catching his foot in a cuff. A jacket or coat should be worn or carried to insure against wear and tear on elbows and back.

A small frameless pack is generally worn to carry items such as the lunch, first aid kit, gloves, rain jacket, and extra clothes and boots. A pack with a frame will sometimes become wedged in a chimney or a crack, causing the climber trouble in releasing the pack, while still retaining his balance and hold.

In a sport of this nature there are, of course, certain potential hazards. If climbing is done in the best approved manner and the correct equipment is properly used, the risk is reduced to practically nil. Two perils are almost always present, however. These may be coped with to a certain extent by skillful leadership and planning, but the dangers of falling rocks and a sudden adverse change of weather will continue to be of chief concern.

Rocks may be dislodged by climbers higher on the peak, by the thawing of underlying ice and snow, by rain and wind; or they may just fall. By selecting a route that presents the least possible exposure to falling rocks, by constantly being on the alert, and by using great care with the rope (which may brush rocks on to those below) this hazard is considerably reduced. A climber has only to hear the sinister explosion as a rock strikes near him, to vow forever to keep out of

the way of these high-velocity missiles. In making traverses of rock-swept gullies or at other exposed places, the climbing rope should always be used, no matter how simple the climb. Only one climber should move at a time, while the others keep a vigilant lookout for falling rocks, being ready to warn the climber and secure him if he is struck; or themselves to "make" for cover.

The security of rocks used for handholds, footholds, and belays should always be carefully ascertained before the climber's weight is placed. Judging the strength of the rock used for holds is another of the fine points of climbing. At times a seemingly solid rock or ledge will collapse under the weight of the climber, while a small rock will hold firm. Examining the texture of the rock, searching for minute cracks, and tapping the rock with the piton hammer are some of the ways in which climbers judge the strength of their holds. Occasionally the nature of the climb necessitates a delicate traverse over unsound rock. Under such circumstances, pitons should be used freely, and the second man should keep up to super-alertness, as he belays the leader.

Much climbing is done at relatively high altitudes subject to sudden and severe storms. Climbers may start a climb under a warm and clear sky, only to be lashed by rain or snow when, as often happens, the most difficult part of the climb is reached. Here again wise leadership is necessary. If it seems advisable to turn back as storm clouds gather, the return trip or descent should be made before the party reaches a point where it would be more hazardous to turn back than to cope with the storm. Many famous climbs, however, have been made in spite of weather almost beyond human endurance. Frequently climbers may bivouac in relative security during a storm. When it is believed that the storm will be of short duration, this is generally the wisest plan, provided, of course, that a retreat will still be open regardless of how severe the storm becomes; that it is not too late in the day; and that the weather prognosticator knows his signals.

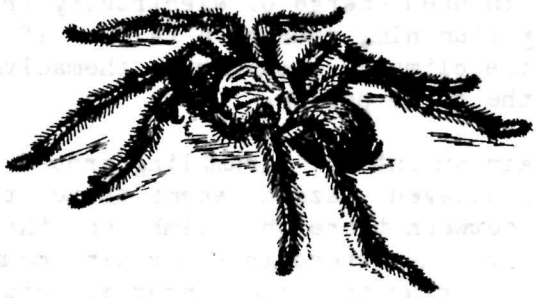
Any climber who has previously huddled on a small ledge on the face of a rock wall, with wind-driven rain pounding into him, will not be without the proper apparel. It is always advisable to carry a light-weight rain jacket or parka and an extra sweater on any climb where there is even the remotest possibility of a storm; and proportionately more extra clothes on high-altitude climbs where freezing weather may be encountered.

Summer storms often bring another hazard in addition to numbing rain, wet and slippery rocks, and stiff climbing ropes. Where lightning will strike is not predictable, but the fact that there is lightning in the vicinity, and electricity in the air, generally is evident. Under certain conditions an induced current of fatal voltage may be absorbed even though the lightning "strikes" many feet away.

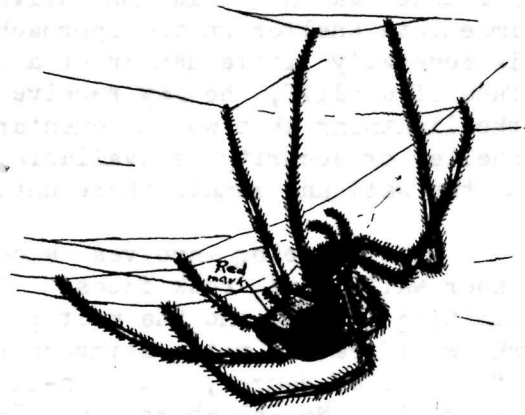
For this reason it is imperative that climbers on exposed rock seek immediate shelter on the approach of a lightning storm. Though there is generally little danger of a direct hit while the climber is on the face of a cliff, he may receive an induced charge of electricity from the lightning that would momentarily stun him, causing a fall. If no shelter or security is available, the climbers should rope themselves to the wall and remain there until the storm passes.

Most climbing involves a certain amount of scrambling around on sheer walls and rock faces. This alleged hazard seems to be the limiting factor and the moot point between those who climb and those who would rather not. Climbers realize that there is a certain amount of potential danger, but non-climbers argue that the danger is actual and real. Non-climbers say, "But what if you should slip and fall?" Climbers answer by saying, "But we don't slip and fall - why should we?"

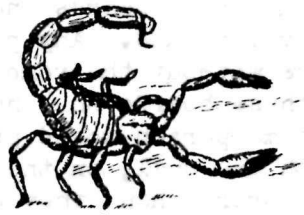
Let's look at it this way: Assume that some boards one foot wide were placed end on end for 100 feet on level ground. Any person would be able to walk the length of these boards without the remotest danger of falling or stepping off. Yet place these boards on a narrow scaffolding 1,000 feet in the air, and the same person would probably lie flat on his stomach and hang on with tooth and nail, on the same width of boards that he so calmly strolled over when they were on the ground. Why? Because he fears the consequences, should he fall. But why should he fall - he easily walked the boards when they were on the ground. Does not this illustration take some of the "alleged" hazard out of climbing? A climber doesn't think of falling just because he is traversing a narrow ledge high on the face of a cliff; he has attained a certain intimacy with high places, and he sees in such a climb not a hovering catastrophe, but a stimulating adventure. Climbing should not be considered reckless and foolhardy - rather let us think of it as a thrilling sport engaged in by those with a keen sense of adventure and a love for the out-of-doors.



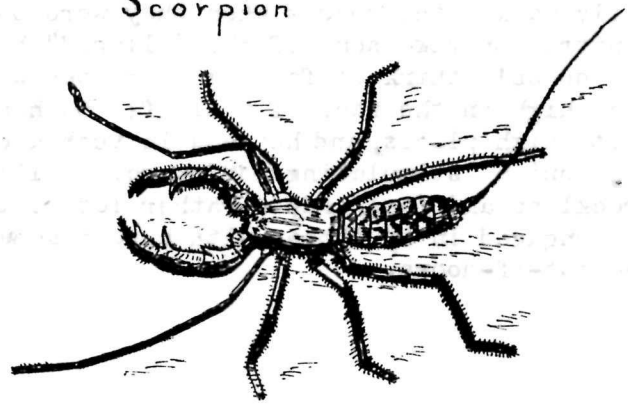
Tarantula Approx. ½ Nat. Size.



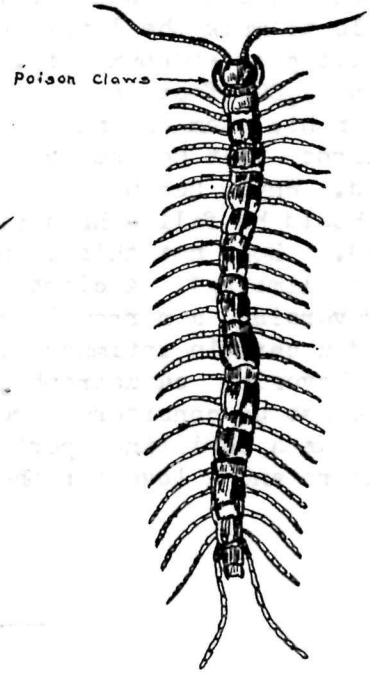
Black Widow
Approx. 2 Times Nat. Size



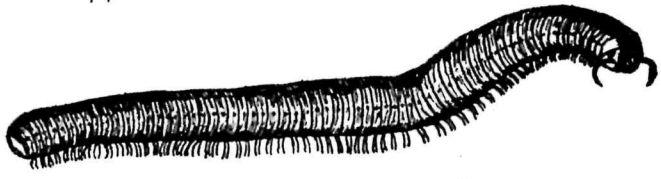
Scorpion



Vinegaroon or Whip-scorpion (harmless)
Approx. 3/4 Natural Size



Centipede



Millipede (harmless)

H.J.Brodrick '40

POISONOUS INSECTS

By Harold J. Brodrick,
Assistant Chief Ranger,
Carlsbad Caverns National Park.

"Poisonous insects" is not quite a correct title for this article as most of the species discussed are in the class Arachnida: scorpions, spiders, etc.; while the centipede and millipede are in the class Myriapoda. None of them is in the class Insecta or true insects. However, they are all called insects by the average person. People vary in their susceptibility or resistance to the poison involved in the bites of many of the insects; a bite unnoticed by one person may cause considerable pain and distress to another. Taken on an average, the black widow spider is the only one we have in the southwest that can rightfully be called dangerous.

Best known in the arid southwest is the big black tarantula. Formidable in appearance, and the subject of much fear and superstition, the tarantula merits the friendship of his human neighbors, for he feeds on grasshoppers and roaches. Equipped with sharp fangs, his bite is painful, but not poisonous to man. These spiders are not pugnacious and do not readily bite unless aggravated. Scientists know today that there is little justification for fear of our true tarantulas. One member of this group, however, a giant species of Central America, appears to be an exception in regard to its venomous nature.

Although science has exploded most of the exaggerated fears of spiders in general, it regards as dangerously venomous one small group found throughout most of the warmer countries of the world. The best known representative of the clan in the United States is the black widow, (Lactrodectus mactans) common in the south, but rare in the north. These spiders are rather closely related to the common house spider, but they have greatly enlarged poison sacs, and the venom is more potent than that of a rattlesnake. Black widows occur in nature under old logs and loose bark or other dark places near the ground. Near human habitations they are commonly found in stables, outhouses, and basements. The female is jet black, with a distinctive red hourglass mark on the underside. The black widows habitually hang upside down (see illustration) from their irregularly woven webs. The male is smaller and has several red and yellow streaks on the black background. He is not known to bite man. When food becomes scarce he is usually killed by his mate, hence the name, black widow. I have found many of the females, and some males, in the mud cases of the muddauber wasp, placed there as food for its larvae. Others were found nearby, in an apparently paralyzed condition, where they were dropped by the wasps.

The scorpion is another member of the Arachnid class, measuring

from half an inch to eight inches in length. They live in tropical and subtropical regions, hiding in crevices, pits, sand, or under rocks during the daytime, but running about actively at night. They capture insects and spiders, tear them apart and devour the pieces. Larger animals are paralyzed by the sting on the end of the scorpion's tail. This sting does not serve as a weapon of defense unless the scorpion is hard pressed. The poison from the sting is deadly to small life. Some of the local people in some parts of Virginia call the harmless little bluetailed skink (a lizard), a scorpion, and think that it stings with its tail.

The Vinegarroon or Whip-scorpion is another Arachnid found in the warmer sections. Staying hidden by day under objects or in crevices, it comes out at night to capture its prey of spiders and insects, which it catches and holds in its powerful pedipalps, the pair of arm-like appendages terminated by a pincher-like hand similar to a crab's. It has acquired the name "vinegarroon" from the strong vinegar-like odor it occasionally emits when disturbed. This creature is ordinarily shy, is harmless, and makes every effort to get away when disturbed; however, when cornered, it frequently makes a show of fight, spreading its pedipalps menacingly. The pedipalps are armed with several sharp spines and are strong enough to puncture a person's skin. The lashlike tail appendage is not a sting.

The body of a big centipede is flattened dorso-ventrally and consists of from fifteen to over 150 segments, each of which bears one pair of legs, except the last two, and the one just back of the head. The latter bears a pair of poison claws with which insects, worms and other small animals are killed for food. The centipedes are swift-moving creatures. Many of them live under the bark of logs or under stones. The poisonous centipedes of tropical countries belong to a separate genus. They may reach a foot in length, and their bite is painful and even dangerous to man. The rest of the species are practically harmless. The small hook on the tip of each walking foot is for use in clinging to objects. Poison can only be transmitted by the pair of poison claws just back of the head.

The millipede is listed here only because many people mistake it for a centipede. It is harmless and does not bite. Its body is nearly round, while the centipede's is flat, and it has from about twenty-five to more than 100 segments. Almost every segment bears two pairs of appendages. The millipedes move slowly, in spite of their numerous legs. They live in dark, moist places, and feed principally on vegetable substances.

Several of the true insects, such as bees, wasps, and hornets, are really poisonous, but ordinarily in a mild way. However, their stings might produce worse effects on some persons than would the bite of certain Arachnids.

PRAIRIE DOGS

By Kennedy N. Clapp,
Member, Texas State Parks Board.

Prairie dogs were numbered in the millions, 40 years ago. Today, they are rightfully and rapidly approaching extinction on agricultural lands, under the government sponsored poisoning and gassing program. Economically, I offer no brief for the prairie dog. He is a pest, destructive to agriculture, and a menace to cattlemen, sometimes reducing potential grazing by as much as 80 per cent. But there are other phases of him for which I plead his restricted preservation. He is as symbolic of the Old West as the cowboy. Both are fast disappearing and becoming difficult to find - the former, due to his misdeeds; the latter, from the evolution of cowponies to automobiles.

The prairie dog is an interesting little fellow to those who delve into his peculiar and sociable homelife, or who domesticate him into a very affectionate, and mischievous pet. Wild or tamed, he is a top-hand in promoting chuckles and those deep abdominal risibilities, vulgarly termed "belly-laffs." He is not a dog. The name is a misnomer, and is said to have been used first by members of the Lewis and Clark expedition, due to the barking cry. He is a rodent, a member of the squirrel family; and a near relative of the woodchuck or ground hog, that well known "forecaster" of spring. The adult is 12 to 15 inches in length, and weighs from 2 to 3 pounds. The color is greyish to reddish brown, with a short black-tipped tail. There is a white tailed subspecies in the Rocky Mountain region.

Their habitat formerly was the dry Great Plains, from Montana to Mexico. Their colonies varied in number from a few to millions. A dog-town of any size today is rare. In the 1901 Department of Agriculture Yearbook, Dr. C. H. Merriam wrote: "Colonies 20 to 30 miles in length are not rare, and in Texas one is known which measures about 250 miles one way by 100 to 150 miles the other, covering an area of about 25,000 square miles. x x x It is certainly a conservative estimate to assume the average number of animals to be 25 per acre. On this assumption, the number of prairie dogs in the great Texas colony must be at least 400,000,000."

My home, in Lubbock, Texas, is about the center of the area formerly occupied by this "yipping" host. Today, there may be a scattered 5,000 dogs within a 100-mile radius. The only town in this vicinity not facing quick extermination is one in Mackenzie State Park in Lubbock. I hope that this small colony may be preserved. It is of great interest to sightseers, especially tourists from the south and the east.

Prairie dog homes are L-shaped burrows, 12 to 20 feet in depth vertically, and 6 to 15 feet horizontally. The accompanying diagram of a burrow is a composite of several drawings that have been made of excavated homes. All features shown in the diagram are not in every burrow. The entrance is banked with earth to keep out water. The size of the mound depends upon location and rainfall. The mound and hole resemble a miniature volcano. From 3 to 6 feet below the entrance is a small room to which the animal retires when first frightened into his hole. There he may be heard barking and scolding. If he hears the intruder approaching too near, down he slips to the bottom. It is a place where he may halt, turn around and go back for a peep, or come out if the "all clear" signal is sounded by other dogs.

The horizontal passage has an upward elevation with the nests connecting and generally above it. Occasionally, a nest is below; sometimes one is built off the vertical passage. Where the horizontal passage continues to the surface, it appears to be used only in construction for the easy disposal of earth, being partially or completely filled with dirt and trash. A single entrance is the rule. However, double ones are occasionally found, but seldom is the dirt dump passage one of them.

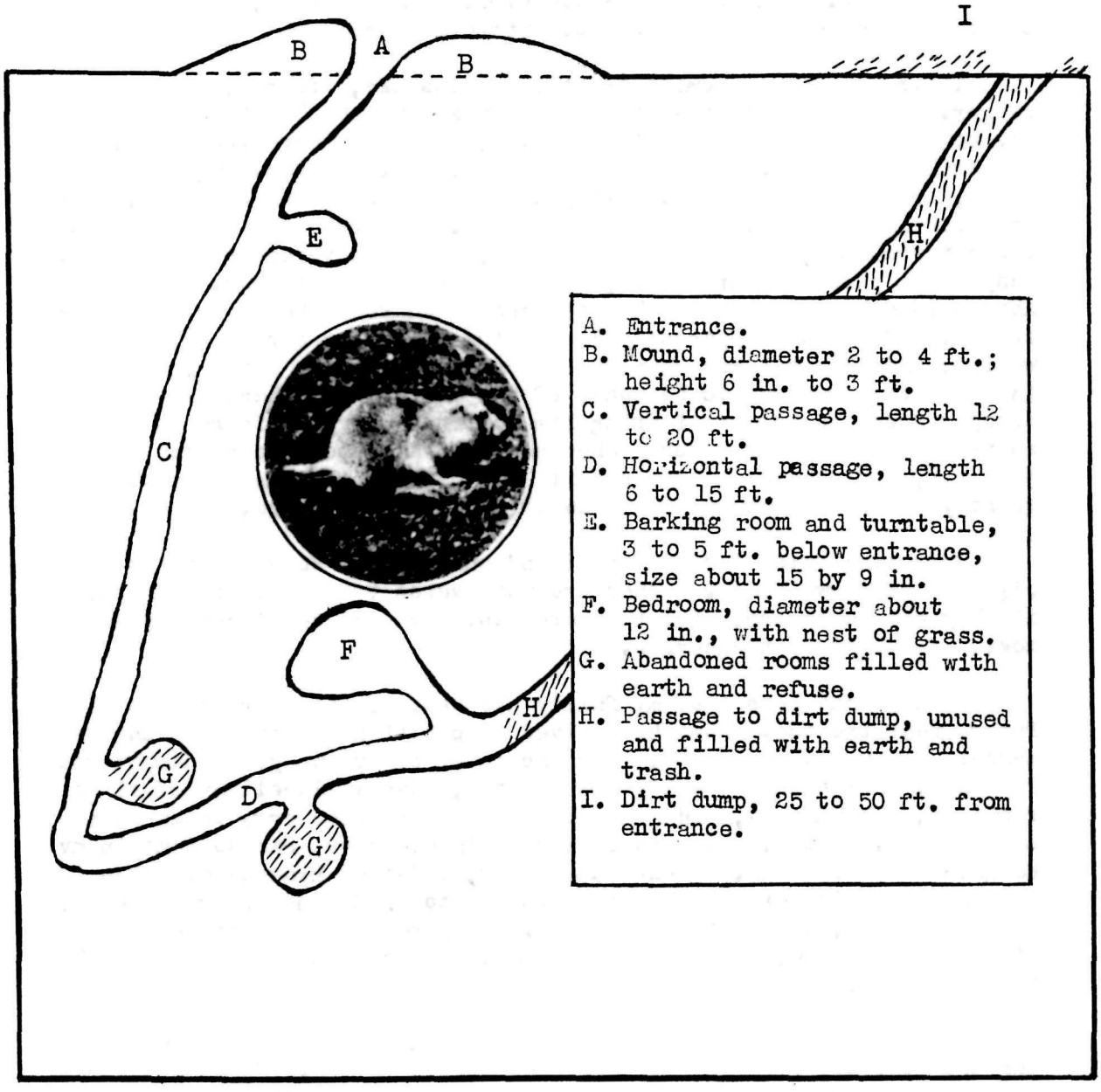
The little animals are wary. They allow no vegetation to grow higher than six inches, within 100 feet of their burrow, thus providing a clear view of approaching enemies. They seldom go farther than 100 feet from a hole. The approach of an intruder is signaled by a Yip! Yip! Yip! Instantly, every dog "freezes", and is alert. A fourth yip from the alarmer, and all dogs scurry for their holes, sit up on the rim of their craters in readiness to dive to safety. If the foe approaches too closely, there is a babel of yips and all dive into their burrows. Prairie dogs that are shot when on the alert over their holes, seldom fail to make a death leap into their burrows.

In construction activities the dogs display ingenuity. If the earth is damp, it is made into balls for removal to the surface; if dry, it is carried out in armfuls. The nose and head are used to tamp the earth to firmness around the entrance hole and the inside of the crater. When there is a general repairing of mounds in the colony, we may anticipate rain.

They are vegetarians from circumstances only, as they are omnivorous in captivity. Their food is the plant life about them: grass, weed seeds, leaves, stems, and roots. Like desert rodents, they subsist without water, the necessary moisture being obtained from green food. The common belief that all towns have a hole dug to the depth of water is a fallacy. Drillings for oil have been made in towns with no water being found down to 1,000 feet.

The animals are semihibernating, climate determining the sleeping periods. In the Texas Panhandle, they appear daily after noon when

PRAIRIE DOG HOME



A. Entrance.
B. Mound, diameter 2 to 4 ft.; height 6 in. to 3 ft.
C. Vertical passage, length 12 to 20 ft.
D. Horizontal passage, length 6 to 15 ft.
E. Barking room and turntable, 3 to 5 ft. below entrance, size about 15 by 9 in.
F. Bedroom, diameter about 12 in., with nest of grass.
G. Abandoned rooms filled with earth and refuse.
H. Passage to dirt dump, unused and filled with earth and trash.
I. Dirt dump, 25 to 50 ft. from entrance.

the temperature is above freezing and the weather not inclement. They are seldom seen when the thermometer registers as low as 20 degrees. No winter storage of food has been noted. They acquire a heavy layer of fat on their bodies in the late summer and fall, which carries them through the winter. The young are generally four in number and appear in late spring. There are few bachelors and old maids, judging from the rapid increase in the Mackenzie State Park colony.

Their principal enemies are the rattlesnake, ferret, coyote, and badger. It is a myth that the rattlesnake and the "dog" dwell amicably together. They are mortal enemies, and each fears the other. If his snakeship enters an inhabited burrow, Mr. and Mrs. Dog leave in haste, if they can escape. They emerge shrieking the bad news, and immediately start plugging the entrance. Neighboring dogs rush to their assistance, and the dirt "flies", from the vigorous scratching. Many noses pack the earth hard, and the snake is entombed. Old dogs have seldom been found in the stomachs of snakes that have been dissected. The snake apparently is fearful of being buried alive. He watches and enters holes when the parents are away, to catch young dogs in the nest. He seems to be aware of the danger, as a handful of earth dropped down the hole will bring him out in a hurry. There is no response to the same procedure when he is in a subterranean nest of the pack rat, for these latter rodents do not entomb him. Snakes frequently enter the rat nests and await the owner's return.

Burrowing owls live in abandoned burrows to save the trouble of digging their own homes. They are not averse to a meal of young dog, if they can catch one, but they are quickly torn to pieces by adult dogs, if caught in the burrow.

Of the many pets that my family has had, we rate our prairie dog, Peter, near the top. When he arrived competition was strong among the members of our backyard zoo, for the favor of my two young daughters. This zoo, collected by a Boy Scout troop, was a miscellany of birds, reptiles, and mammals; ranging from a wing-crippled crow to an untamable bobcat. Buff, a canine of uncertain ancestry, was supreme in my daughters' affections. Next came Kingy, a 3-foot kingsnake. Then in descending scale were Billy Coon, Flops Rabbit, Jim and Molly Whiterat, Quacky Mallard, and Goofus Armadillo. So Pete had a job to become one of the favored few, but he took the task in stride and soon was in the select circle.

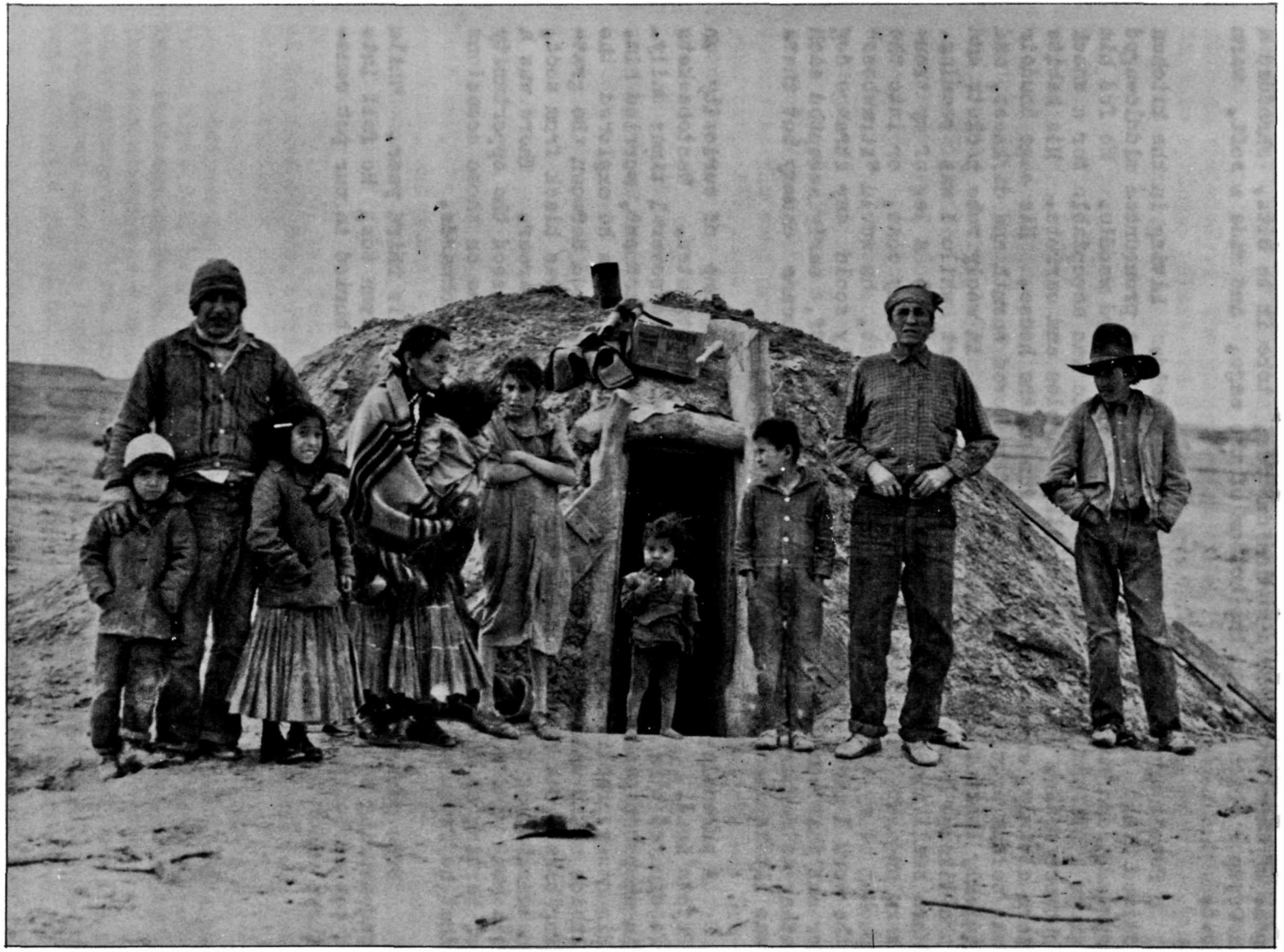
Peter was probably two months' old when "drowned out" and captured, a pitiful, bedraggled, terrified little fellow. He tamed quickly, and soon would cuddle contentedly when his stomach was rubbed. That was always the acme of bliss to Pete. A horned toad is the only other creature I have seen that enjoyed it so much. Pete would lie with closed eyes so long as one would rub, and he would occasionally emit a little yip of delight. His wire cage in the kitchen included a

small wooden box for a boudoir. We offered him a variety of bedding materials, such as grass, cotton, wool, and leaves. He would have none of them but stole a woolen dustrag, tore it to bits, shredded a newspaper which was on the bottom of the cage, and made a soft, warm bed.

Pete's appetite was wonderful to behold. Living in the kitchen suited him. Eventually this appetite caused a pronounced middle-aged spread, and reduced his scampering to an awkward waddle. We fed him green stuff and grain, but anything edible was acceptable for a snack between meals. He especially liked apples and carrots. His habits were cleanly, and we gave him the run of the house. His cage boudoir was seldom used, except at night. Pete loved warmth and darkness, and quickly located several snoozing hideaways in wooly robe pockets and the like. He enjoyed getting inside my shirt while I was reading. When small and active, he would occasionally climb a leg of my trousers and get into the outside breastpocket of my coat, or into the pocket of my shirt. With his head peeping out, he would "strawboss" the work I might be doing, and would vigorously scold any strange dog or cat that came around. He and our dog, Buff, early accepted each other as members of the family. They never became chummy but there was little discord between them.

A phrenologist might have found a large bump of curiosity on Pete's head. Anything unusual must be investigated. Wastebaskets fascinated him; their contents must be examined several times daily. An unopened package, especially in the larder department, worried him. His nosey proclivities often ended in trouble. Once he explored the inside of an unlighted furnace. We found him wedged between the grating bars, weak from his struggles to escape. He was black from soot, necessitating the only bath of his checkered career. There was a basement window at ground level where he seldom missed the opportunity of barking at his reflection. He was so vociferous on those occasions that he frequently upset himself and went over backwards.

Pete passed on to prairie dog heaven in his third year. While endeavoring to reach a piece of toast from the oven top, he fell into a pot of boiling water. He was ceremoniously buried in our pet cemetery, under the lilac bushes.



NAVAJO FAMILY AND HOGAN

NAVAJO LAND

By Dorothy Elder,
Secretary to the Regional Director.

Many people travel to foreign countries to visit unusual places, and to see people whose mode of living is different. Yet here in our own southwestern country is a race that is amazingly primitive, when we consider its contact with civilization. As a school teacher, I lived for a year among the Navajo Indians, people who live very much the same as did their ancestors. They are oblivious to progress, and they are steeped in an ancient religion. Approximately 54,000 Navajos live in northeastern Arizona and northwestern New Mexico on a reservation that covers some 22,500 square miles. The country is semi-arid, and it appears desolate. The mountainous regions are beautiful. Juniper, pinon, greasewood, and in higher elevations, the pines, keep much of the landscape green. Soil erosion and other factors have seriously damaged the grazing qualities of much of the land, but the federal government is endeavoring to correct this condition.

The dome-shaped "hogans", or homes, of the Navajo Indians dot the hillsides. The hogan is a log structure, usually six or eight-sided, covered with a dirt roof which gives it a bee-hive appearance. There are no windows. The small door is draped with sheep skins. An opening is left in the roof for the escape of smoke. The one room is living quarters for the entire family. Occasionally one will find a more modernized home with a stove. However, most homes have open fires and scanty cooking utensils. Sheep skins on the dirt floor serve as beds.

The Navajo woman is picturesque. Her dress is copied from the 18th century Spanish. She wears many skirts of bright materials, gathered full about the waist. The only change in fashion seems to be the slight lengthening and shortening of the skirts. A velveteen blouse completes the costume. It is of a bright color and is trimmed with silver buttons or silver money. The hair is twisted into an intricate knot and tied with yards of string at the nape of the neck. Frequently moccasins cover the feet. In cold weather she wears a blanket of striped, bright colors. This blanket also can be used for carrying either supplies or the baby. The baby is usually strapped to a board cradle and carried on the mother's back. Tiny youngsters trot beside their mother clinging to one of her skirts.

The men are less colorful in appearance. Some have long hair combed similarly to the women's headdress. Many of the men with short hair wear bright bands about their foreheads. They wear overall trousers and bright shirts. They are fond of large cowboy hats and will frequently pay high prices for them.

To a stranger, a Navajo seems a stoic; unemotional and unfeeling. Among his own people and friends, he is happy, carefree, and fun-loving. Apparently, he never worries. Material possessions are few; except for jewelry, only useful things are desired. When there is a lack of food, that condition is accepted with surprising indifference. He is able to survive extreme hardships. The same is true of the women and children. Time is an element of which he has little conception. Seldom does he hurry. His trading methods distract the average white man, for it takes him forever to come to the point and consummate a trade. If a Navajo visits you, he might sit for many minutes without stating the purpose of his visit, for, in his opinion, it would be impolite to discuss business matters immediately. Such a tempo of living is difficult for us to understand, but it has its merits of ease, tranquility, and peace of mind.

The Navajo life is a nomad existence. Unlike the Pueblo Indians, these people do not settle in groups. The family is the central interest. Since their hogans are temporary structures, easily built, it is not difficult for a family to move. The family's wealth is measured in terms of sheep, so these Indians will necessarily move to better grazing lands. They live in the sheltered valleys and canyons in the winter months, and, in the spring, often move to higher elevations where there is more grass. During the summer in the mountains, they seldom build a substantial hogan; instead, they make a crude shelter of branches, a sort of lean-to, or they just live under a juniper tree. The Navajo children are taught early in life to wrestle with the elements. Throughout their lives they remain undaunted by the severe cold and the intense heat. The smallest youngsters are sent out for the entire day to herd sheep.

Each family has a few horses, and all members of the family are excellent riders. Even the women are graceful figures astride Navajo ponies. The Navajos love their horses and treat them as friends. When a Navajo dies, his favorite horse, according to custom, should be killed and buried with him so that the Indian will have a horse to ride to the other world; but the government has made this practice illegal, and it is no longer observed.

Contrary to many other races, the woman is the head of the Navajo family. When a man marries, he comes to live with his wife's people. If the wife wants a divorce she places the husband's saddle and his other possessions outside the hogan. This is formal notice to him that he is no longer a member of the family. On the whole, however, the Navajo people are quite moral. Divorces are few. Usually a woman will consult with older members of her family, and the cause must be serious, before divorcing her husband.

The women weave the famous Navajo blankets. It is a fascinating sight to watch a woman, seated on a blanket beside her hogan, skill-

fully, and with swift, graceful fingers, weave into her blanket a beautiful pattern of color and design. Her loom usually is tied to a tree branch and stretched upright before her. As a portion of the blanket is finished, she rolls it on a stick, thus keeping the working area before her. She has no "blue-print" pattern; the idea is carried in her mind. One will never see two Navajo blankets exactly alike. The men are equally skilled in the art of making silver jewelry. Although this work was copied from the Mexicans many years ago, the Navajos have become so skilled, it is now their own unique art.

The trading post is a central gathering place for the Navajos. They bring rugs, jewelry, and wool. They seldom want money, but they will trade for the supplies and clothing they need. The trader must have great patience and understanding of his Navajo friends, for it usually takes them hours to bargain; they are shrewd. The trader will often have to carry large credits for many months, or even years, when the Navajos cannot pay. Usually they will leave their jewelry with him as credit and, when crops are good, they will come back to the post to redeem the jewelry.

In spite of the efforts of some people, the Navajo clings to his ancient customs. Very infrequently do we find him becoming a Christian. When another religion is adopted, it is usually as an addition to his own beliefs, rather than a renunciation. His religion is based on mythology, explaining the way in which the Navajos came to inhabit the earth. There are numerous fascinating stories about supernatural beings who protected the Navajos at the beginning of time, and who are credited with having performed miracles. Usually these beings are personified animals or the natural elements of the earth.

Since there is no written language, these teachings have been handed down by word of mouth. Every hogan faces east, for it is there that the gods gather at dawn, and it is a good omen for the sun to smile upon the Navajos as it rises. Occasionally I would see a Navajo emerge from a nearby hogan and, lifting his arms high above his head, sing a simple, plaintive prayer to the sun.

Navajos have a fear of the dead, and at that time they are grateful for the white man's assistance. If a member of a family dies within a home, that place is immediately abandoned. "Tchindis", or devils, are believed to be lurking there. A hole is knocked in the north wall so the dead spirit may depart. The devils cannot climb, so they are left safely within. Very often a temporary hogan is built in which to place the person who is ill so that the original home will not have to be abandoned, in the event of death.

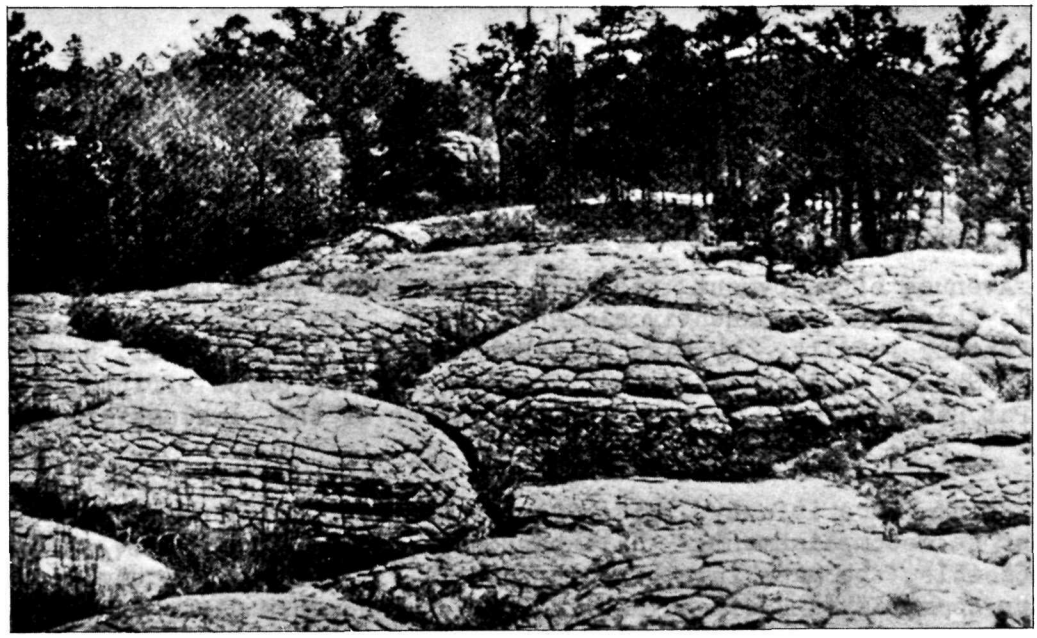
A sing is a ceremonial intended for healing. It is somewhat complicated and usually lasts several days. There is a definite ritual to be followed under the leadership of the medicine man. Everything must be done exactly right so the wrath of the gods will not be incurred.

During the sing, sweat baths, or purification ceremonies, are performed. This is done by placing hot stones in a circular hut large enough for one person to lie down. Water is poured over the heated stones to produce an effective steam bath. Toward the close of the ceremony, the sand paintings are drawn, a beautiful art and custom. Sand paintings are made by trickling colored sand about the floor of the hogan. The pictures are usually of some supernatural being. They must be made and destroyed between sunrise and sunset. The patient is placed in the center of the picture, and the sand is put over the body while the songs are sung and prayers said for the cure.

The medicine man is the outstanding member of the community. His services are expensive. The more the patient can pay, the more effective the treatment. One woman made a beautiful rug with figures of some of the gods designed upon it. She later feared her brain might be "filled with cobwebs"; that she might lose her mind, because she had drawn permanent pictures of the gods. The trader had given her $400 for the rug. It cost her exactly $400 to employ a medicine man to brush the cobwebs from her brain.

There are many beautiful dances which the Navajos hold at several seasons of the year as prayers for rain, good crops, and general prosperity. Visitors are always welcome at these dances. Don't use your camera, though, unless you have the Indians' permission. Friendliness, a pack of cigarettes, or a small gift, will often win a person's way into the more interesting aspects of Navajo life.

Navajo land is fascinating. It is viewing life almost as it was lived 100 years ago. It permits of knowing a people who have remained true to their beliefs and customs, and who have kept themselves individual. Visit Navajo land if you can. Get onto the back-trails. You will find an admirable and fascinating people, as well as scenic beauty.



ROCK BISCUITS

By Dr. Chas. N. Gould,
Former Regional Geologist.

Rock biscuits, done to a golden brown, some of them 20 feet high and 30 feet in diameter, are "served" to visitors as one of the unique attractions in Petit Jean State Park, Arkansas, about 50 miles northwest of Little Rock. Nothing quite like them has been found elsewhere. Thousands of people see them each year, and wonder how they were formed. What was Mother Nature's recipe for making this pan of biscuits, and how did she manage to get that brown tint on them? Rather complicated geological processes were involved in forming and "baking" these dome-shaped masses of sandstone.

Most of the hard rocks exposed on the earth's surface contain cracks or crevices. Geologists call them joints. Usually joints are arranged in a definite pattern. In the case of these rock biscuits there are two systems of joints crossing nearly at right angles, forming squares. The joints were probably formed by shrinking of the earth's crust. Then water sinking along the joints dissolved portions of the rock, allowing other portions to crumble away, and finally oval-shaped surfaces like the tops of biscuits were formed.

Mother Nature did not use a giant biscuit-cutter to shape the rock biscuits. Neither did she bake them in a fiery furnace. Instead, the cool water that trickled over the sand grains contained iron in solution; part of the iron was deposited as cementing material in the sandstone, and when exposed to the atmosphere, the iron oxidized to give the varying brown tints. With slightly different physical conditions the sandstone probably would have weathered out into stone pillars, pinnacles, towers, balanced rocks, and other erosion forms, such as in Bryce Canyon National Park, Utah; and Chiricahua National Monument, Arizona.

LIGHT IN THE DARKNESS

By Leo A. McClatchy,
Special Assistant.

Avenues of enjoyment and self-improvement which many sightless people think are permanently closed to them, are being explored, with fascinating results, by Miss Elizabeth Garrett, of Roswell, New Mexico. She is a daughter of the late Southwestern peace officer, Sheriff Pat Garrett, who terminated the career of the lawless Billy The Kid.

Blind since infancy, Miss Garrett has utilized her handicap as a ladder to accomplishment. "All handicaps," she says, "must, as much as possible, be made into stepping stones." She is an active member of her community's Business and Professional Women's Club; she sings, plays the piano, and composes music. As a teacher of voice, she is self-supporting. She does her own housekeeping and her own cooking in the studio home she shares with a canary, a cat, and her Seeing-Eye Dog, Teene. She has poise and graciousness, with an extremely attractive personality that puts you immediately at ease. Friends know her as a charming conversationalist. She is well informed on the world of today and yesterday. There is a nimbleness to her mental alertness, stimulated by an active, knowledge-seeking inquisitiveness. This she nourishes through Braille reading, by conversation, and the radio. She plays Bridge, with cards that have raised numerals and designs.

"Indeed," as one of her many friends remarked, "she seems to get much more out of life than do some of the rest of us."

Miss Garrett is an enthusiastic "sightseer" - gets a mental and spiritual uplift in "doing" such places as the Carlsbad Caverns National Park. She has visited that underground Land of Fantasy on four occasions, twice in company of Teene, and always on the regularly scheduled walking trips with hundreds of other visitors. She plans to be there again this year on Governor's Day, probably in mid-May, to lead the thousands of school children in singing the official state song which she composed: "Oh, Fair New Mexico."

Modest to the point of shunning even mild publicity, Miss Garrett, who uses an ordinary portable typewriter for most of her correspondence and other writing - a Braille machine when the occasion requires - declined an invitation to write her impressions of the caverns. She feared that some people might feel she was endeavoring to publicize herself. She consented to an interview, when it was pointed out that other sightless persons might thus learn of the possibilities of stimulating and developing within themselves an added appreciation of Nature.

She was returning from a shopping expedition, carrying groceries

MISS GARRETT AND TEENE

for a luncheon to which she had invited a friend, when I met her on the sidewalk fronting her home, La Casita Studio. From others I had learned that once she heard a human voice, she would immediately recognize it thereafter, though years might pass between meetings. She had never heard my voice but she had been expecting me, so when I greeted her with a "Good morning, Miss Garrett," it was not necessary that I further identify myself. She shifted the packages under her arm, changed to her left hand the guide rein she was holding on Teene, and greeted me with a hand-clasp and a smiling assurance that she was happy I had come to visit with her. Teene, a sleek, black, 5-year-old female Original German Shepherd, graduate of the Seeing-Eye School in Morristown, New Jersey, regarded me with suspicion, but became immediately friendly, after carrying out her Mistress' instruction to "sit and shake hands" with me.

Teene piloted us along the narrow walkway through the lawn, leading to the studio that sets back between adjoining homes. Miss Garrett reached into the mail-box on the wall beside the front door. Then, in apparent after-thought: "I must see if there are any messages," she reached up to a little artificial gourd suspended from the porch ceiling. "If not at home, leave note," was printed on the gourd, whose tiny door opened into a panel that housed a small notebook and pencil. A feel of the pages told her that no messages had been written.

She unlocked the front door, and we entered a small living-room. The furniture arrangements indicated excellent taste. The hardwood floor was freshly polished. I looked for, but didn't see, any dust; not a speck. "She's a meticulous housekeeper," I thought, as she indicated an overstuffed chair, and invited me to be seated.

Teene was unharnessed, as her guide-services are not required in the home. She glanced disdainfully at the large cat brushing against my leg, and there seemed to be something of a sneer in her sniff.

"They are not good friends," Miss Garrett said.

My hostess chose a small rocking chair beside the grand piano. She called to the Roller canary in a small cage in the adjoining sun-room to whistle for us. The bird responded immediately.

"You were interested in knowing about my reactions to visits I have made in the Carlsbad Caverns," Miss Garrett commenced. "Of course, the experience of having been in such a wonderful place is one that no person could ever forget. I was a bit hesitant at first, about going. The Business and Professional Women's Club invited me to go along on their trip as an honored guest. I talked with others who had been in the caverns, seeking to get some description of the place. But each merely replied something to the effect that 'Oh, it is too wonderful; I can't describe it.' I thought that if they couldn't express themselves about it, the trip would be a perfect bore to me. But it wasn't. Superintendent Boles at once ingratiated himself by being my first es-

cort, as I didn't have Teene then.

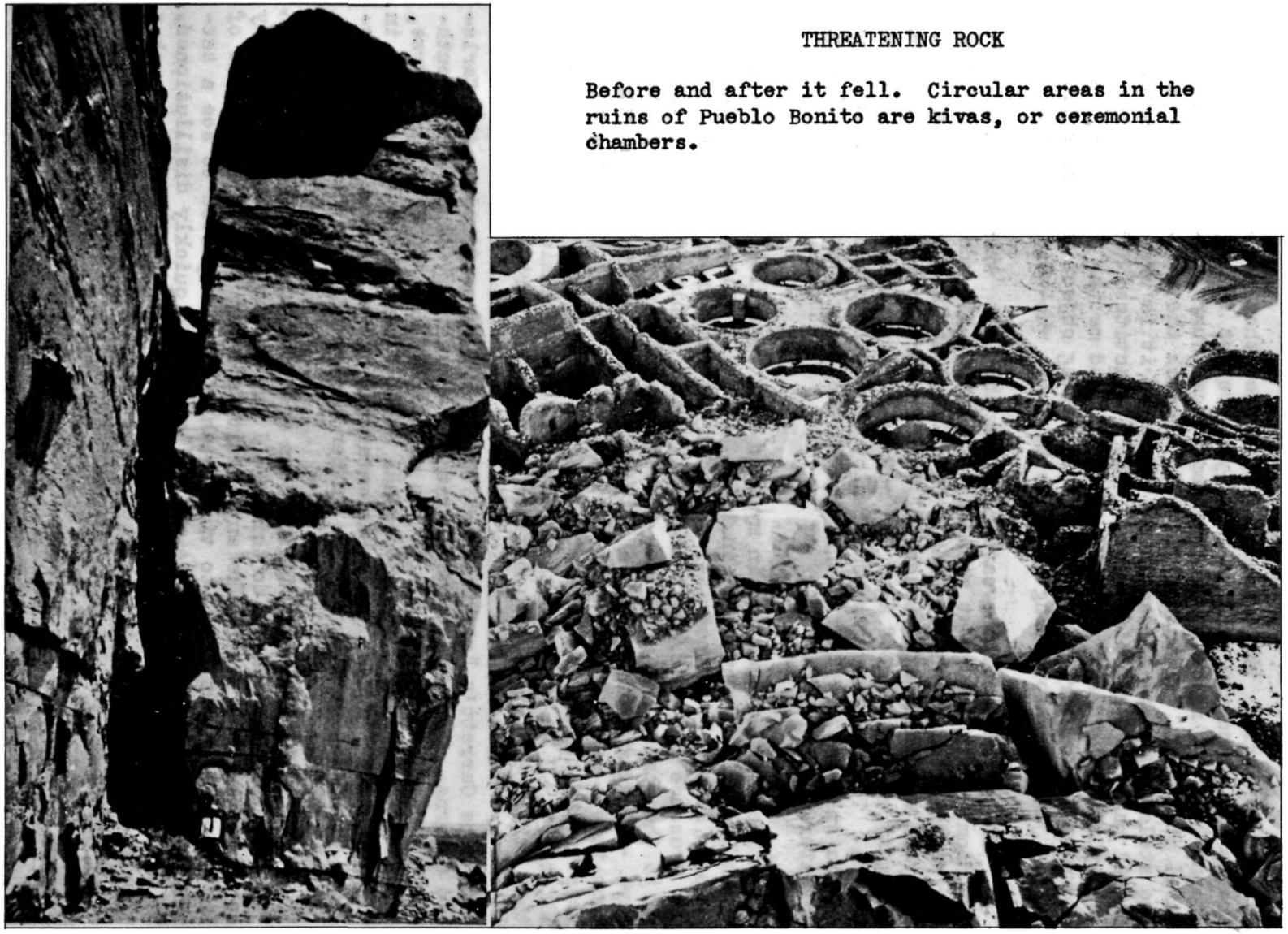
"On entering the caverns, you sense that the ceiling suddenly leaves you, and you realize that you are not in a little hole in the ground but in a mammoth subterranean place surrounded by the most natural phenomena. I was privileged to touch the wonderful lacework of the stalactites and stalagmites. None of it is wrought the same. It is all patterned and different. The stalactites, when touched, have really musical tones. Colonel Boles showed me the lily pads, and he showed me also every conceivable interesting object in bass relief, so it was just as interesting to me as to those who were looking at it.

"The vastness of the cave is seen and felt when we get into the Big Room, with its great area and its hospitable odor of good coffee. Any description of the caverns, of course, is inadequate. But it is always a wonderful experience. I look forward to it. I love it. The ceremony at the Rock of Ages is not to be described but to be experienced. The courtesy always shown by the Superintendent and the Rangers is splendid. That's what makes the trip a perfectly glorious adventure to anyone.

"There is no question in my mind that regardless of any difficulty an individual may have in life, it is a privilege to take that trip. No one could possibly come out without knowing he had been in the presence of the Creator of all things. I think that if people who go to the caverns do not have, or use, the most wonderful gift that we have - imagination - such a trip will give it to them, or stimulate them to use what they already have. Instead of being a bore, my first trip turned out to be the most pleasant and inspiring experience of my lifetime. I do surely suggest with all the enthusiasm that I possess that other people avail themselves of the good fortune I have had."

Miss Garrett's "sightseeing" has not been confined to the Carlsbad Caverns. She has traveled rather extensively through the Southwest, and in other sections of the country. Her own city, of course, she knows intimately, as she spends much of her time walking, and in visiting with friends. She has entertained the Business and Professional Women's Club at barbecues in her back yard.

"I don't believe in sitting down and folding hands," she explains. "If people really want to do things - I don't mean just half way - they can do them, so I don't take any credit for what I am doing. Some of the people who have come to visit with me have expected to see a secretary and a maid, but those people have been quickly disillusioned. It is my pleasure to do for myself. I maintain that everyone who makes the effort receives the highest inspiration from loved ones and friends."



THREATENING ROCK

Before and after it fell. Circular areas in the ruins of Pueblo Bonito are kivas, or ceremonial chambers.

THREATENING ROCK CRASHES

Threatening Rock, 30,000-ton block of sandstone in New Mexico's Chaco Canyon National Monument, toppled over, during the afternoon of January 22, and caused considerable damage to a portion of the famous prehistoric apartment house, Pueblo Bonito. Big chunks of the 100-foot high Rock, some of them as large as a small residence, fell into the 800-room pueblo, demolishing much of the stabilization work that a Navajo Indian CCC Unit had recently completed on the 1,000-year-old structure. A 50-year-old Navajo, sharing the belief of some of his tribesmen that the world would end when the Rock came down, crouched in his tent and cried.

Present plans of the National Park Service are to leave the Rock as it fell, and to resume stabilization work on the pueblo.

Threatening Rock was a detached segment of the cliff wall, near the base of which Pueblo Bonito was constructed, probably between the 10th and 12th centuries. The prehistoric Pueblo Indians apparently feared it might crash, for they built masonry buttresses to protect the base of the huge block. In recent years the Rock had been moving in fractional inches, sometimes inward, sometimes outward. Heavy rains and snows in early January are believed to have undermined it.

A 15-ton boulder fell from near the top of the Rock on the night of January 21. Its crash rattled windows in the residence of Custodian Lewis T. McKinney, 600 feet away. McKinney climbed the cliff the following noon and found that since the last measurements, on December 23, the Rock had moved outward 10 inches and settled 4 inches, as well as moving west 14 inches. While he was measuring he could hear the Rock popping and cracking, and he could feel it grating and grinding.

The Rock fell at 3:24 P.M. The slab leaned out about 30 or 40 feet from plumb, and settled sharply. Rocks from the top broke loose and were propelled into the ruin. Some fragments were thrown 360 feet from the Rock's original base. The lower two-thirds then pivoted on its outer edge and fell down the slope toward the ruin. The whole mass broke into many fragments, and an avalanche of rocks catapulted down the slope and into the walls of the back portion of Pueblo Bonito. The highest walls of the ruin were not damaged. A 1,000-pound boulder was hurled 50 feet over a cement mixer at the side of the ruin.

Approximately one-fourth of the original volume of Threatening Rock now fills 21 damaged rooms of the pueblo. The other three-fourths lie in an imposing jumble of huge rocks between the ruin and the Rock's original base. The debris portrays in graphic fashion the conclusion of a story of fear and anxiety which had its beginning a millennium ago.

GREAT HORNED OWLS

By Natt N. Dodge,
Assistant Naturalist,
Southwestern National Monuments.

Bright moonlight flooded the desert, the dark shadows of the scrubby mesquite and scraggly creosote bushes contrasting sharply with the brightness of the lime-impregnated soil. From my bed by the back wall of the 'dobe house, where I spent the summer nights, I looked around wondering, foggily, what had roused me. My eyes had almost fallen shut again, when I noticed a slight movement near the base of a clump of nearby saltbush. One of the many cottontail rabbits which occupy the square mile of Sonoran desert which is Casa Grande National Monument, in Arizona, hopped casually across the open toward the shadow of a creosote bush. And then I was suddenly wide awake!

From the branch of a mesquite tree 50 yards away a dusky figure launched itself upon broad wings and, silently as a shadow but true as an arrow's flight, glided earthward. There was a muffled thud, a shrill stifled cry, and a short struggle in the shadow of the creosote bush. Then with a soft beat of wide wings the Great Horned Owl lifted itself into the air. For a moment I had a clear view of it in the bright moonlight, as half dragging, half carrying the rabbit, it rose heavily. Barely clearing a clump of saltbush, it gradually gained altitude and, once again a shadow in the moonlight, disappeared behind a corner of the old 'dobe house.

Great Horned Owls for many years have inhabited the famous Casa Grande. One of the first references to them was made by Dr. J. W. Fewkes, who carried on excavations in the ruins in 1906-1907. He stated, in referring to the superstitious fear with which the native Pima Indians held the old ruins, "The hooting of the owls which nest in the upper walls may add to the Pimas' dread of it."

The Pima Indians who occupy the nearby reservation are inclined to shun the ruins, particularly after sundown. That the owls may play a considerable part in this distrust is evidenced by the fact that monument personnel who have hired Pima girls as maids have encountered difficulty in getting them to stay on the monument over night. Once

the girls have heard the voices of the owls emanating from the deep shadows beneath the broad shelter, they remember that they have important business at home on the reservation. The Pimas call the Great Horned Owl "Chu'koot", and believe that he is the soul, spirit, or reincarnation of the Pima dead. Apparently many Pimas who retain the vestments of the living have no desire to meet the spirits of their relatives who have discarded their human bodies for a pair of wings.

Rangers conducting groups of visitors point out the owls, high among the rafters of the shelter, and find that people are universally interested in them. Occasionally an old timer in the party will mention having seen the owls on some long-previous visit, and ask if these are the same birds. This might be a hard question to answer were it not for the fact that at least three of the birds are known to have met death. In 1909, M. French Gilman reported: "For at least four years, a pair of these owls has nested in the prehistoric Casa Grande ruins. Mr. Pinkley, the custodian, told me that the birds raised a brood each year in the old building and had never been molested except once, when one of them developed a decided taste for prize Wyandotte chickens. This was his undoing, but his widow secured another mate very soon and went on keeping house as if nothing had happened."

No semblance of a nest is built. The eggs are laid in a depression on the wall top. Observations conducted over a number of years indicate that brooding begins late in January or early in February. Usually four eggs are laid, evidently several days apart, as they apparently hatch at relatively lengthy intervals; at least, the nestlings vary considerably in size. The incubation period of this species is 28 days.

Prior to the commencement of the brooding, considerable evidence of excitement is noticed. Among records made in January are the following: "Hooting begins at about 5:30 p.m. and continues until late at night. Both owl voices are heard and clucking sounds are interspersed between hoots." "At 8:30 p.m. I heard peculiar sounds issuing from the shelter. Mingled with soft, muffled hooting was a harsh call resembling a terrier-type dog trying to bark with something in its mouth."

Just when the eggs hatch is not definitely known, as the location of the nest is inaccessible without ropes and ladders, and the presence of this equipment disrupts visitor use of the ruin. However, on numerous occasions early in March both adults have been seen together among the shelter rafters or, shortly after sunset, in the branches of mesquite trees west of the ruin. After the young birds have arrived, the adults show irritability, often snapping their beaks at visitors. A number of years ago, a visitor with a small dog on leash was walking past the outside of the ruin when, without warning, one of the adults swooped silently from among the rafters, raked the dog's back with its talons, and returned to its perch.

These owls can see sufficiently well in broad daylight to spot and catch small rodents. On one occasion, shortly after 9 o'clock in the morning, an adult was seen to swoop down from its shelter and pounce upon a ground squirrel, approximately 100 yards away. Carrying the prey in its talons, the bird flew back to the shelter, and was joined by four owlets. The youngsters flapped their wings and uttered harsh cries. Suddenly one of the young birds snatched the body of the squirrel from the talons of the parent owl, and flew down to the top of a lower wall with it.

On especially hot days, when the temperatures range around 115°, the owls frequently come down from their usual perches on the beams beneath the high center of the shelter and stand on the ruin walls. On a few occasions one has been seen on the floor of the center room of the ruin, apparently trying to escape the heat. During hot weather they are often seen to open their beaks and pant, as a domestic hen does on a hot day. Soon after sundown in summer, all of the owls leave the shelter, one by one, and glide to nearby mesquite trees where they perch silhouetted against the sky. On hot evenings they are often seen with wings slightly raised and extended, as if in an effort to cool off. As dusk deepens, one will leave its perch, flapping its wings to gain momentum, then sail across the desert in a long, low glide only a few inches above the tops of the creosote and salt bushes, to soar sharply upward on approaching another mesquite tree and settle lightly on one of its extended limbs.

Summer dusk is an exciting hour at the Casa Grande, for at this time the thousands of bats that inhabit the cracks of the mud walls arouse to squeaking and rustling activity. In black waves they fly from the building, and in twisting streamers pour out into the evening to disappear as dancing dots against the pink and lemon western glow. Ordinarily the owls pay them no heed, but on one occasion I saw an owl, leaving the shelter, rare back in full flight and strike at a passing bat, first with one foot, then with the other. Whether the bird was simply annoyed or considered the bat as a possible meal is a question.

Although no serious studies of the food habits of the Casa Grande owls have been made, casual observations have been recorded. A number of undigestible pellets regurgitated by the owls were sent to specialists for identification, with the following results: Remains of 16 rabbits, 9 mice, 5 insects, and one bird were found in the analysis. Except for feathers of a mourning dove, only rabbit remains have been in and about the nest when it has been examined. Seasonal conditions undoubtedly cause diet variations. No ground squirrel remains were found in the pellets analyzed, whereas owls have twice been seen to capture these rodents. However, ground squirrels are in hibernation during the winter months, hence would not be available for the owls

during the period that the pellets were collected. Feathers of the following birds have been found in the ruin, but whether they came from victims brought in by the owls is unknown: flicker, road runner, and mourning dove. One of the owls was observed with the body of a male sparrow hawk in its talons. Aside from the report made by Gilman in 1909, telling of the killing of chickens, there is no record of the Casa Grande owls preying upon domestic stock.

By midsummer the young owls are as large as their parents, and are able to manage themselves as skillfully in the air. However, their lighter-colored juvenile plumage and the absence of "ear" tufts or "horns", gives them an unmistakable round-headed appearance that serves to identify them. At night they give a harsh, rasping, screech entirely different from any part of the repertory of the adults.

Each summer, usually about the middle of July or the first of August, the adults disappear. The young, however, remain very much in evidence. Where or why the adults go is not known, but they are referred to as being "away on their summer vacation." The fact that an adult owl is occasionally seen with the young, indicates that they go no great distance, although, of course, the individual might be some stranger who dropped in for a visit. Usually the adults do not return until September, taking up their customary places on the beams of the shelter. Almost immediately following their arrival, the young ones disappear. To an observer with an active imagination, it appears that the adults stay with the young until they feel that the children are capable of taking care of themselves. After an absence of a month or six weeks, the old folks come home, take over the old roof, and chase the young ones out to fend for themselves. Whether this fanciful hypothesis comes anywhere near interpreting the story of what actually takes place in the Casa Grande owl family each year may some day be proved, possibly through a more complete banding program than has been possible in the past.

ODDITIES

A beaver can't misbehave in a national park and "get away with it." One that was having a gay time cutting down shade trees at Phantom Ranch, in the depths of Grand Canyon, was disciplined. After he was caught in a live trap that had been sent down from the canyon rim, he was placed in a specially constructed box and transported 5 miles by muleback to Wall Creek, where he was liberated in an isolated beaver colony. The Wall Creek area in the park is reserved for these little animals. They have the privilege there of cutting down trees, building dams, and otherwise leading natural lives.

The Trail Ridge Road in Rocky Mountain National Park, Colorado, is one of the highest and most spectacular automobile roads in America. Its 4-mile section, at an altitude above 12,000 feet, is probably the longest stretch of road in the United States at such a height.

A big increase in the jackrabbit population in Gran Quivira National Monument, New Mexico, was followed by an influx of Great Horned Owls. These "tigers of the air", swift in flight, and with razor-like talons, are vicious in attack. The ranks of the jackrabbits were quickly thinned - another example of Nature maintaining a biological balance.

The place that gave Francis Scott Key the inspiration to write a song that was to become - more than 100 years later - our national anthem, is now the Fort McHenry National Monument and Historic Shrine, in Baltimore, Maryland. Key, under a flag of truce, had sailed from Baltimore, in 1814, to intercede for the release of a friend who had been captured by the British. Key was detained aboard ship by the invaders, and witnessed the naval attack on Fort McHenry. He noted, "by the dawn's early light", after more than a day's bombardment, "that our flag was still there", and started writing the Star Spangled Banner, which the Congress, in 1931, formally adopted as the national anthem.

The agility of an Alpine goat must have been required by prehistoric Indians who lived in cliffside caves in Frijoles Canyon, in the present Bandelier National Monument, near Santa Fe, New Mexico. The only "steps" leading to some of those homes were notches cut with stone axes into the canyon wall. Water, wood, and the vegetables that were grown along Frijoles Creek had to be carried up that "trail."

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. Platt National Park
46. Hot Springs National Park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