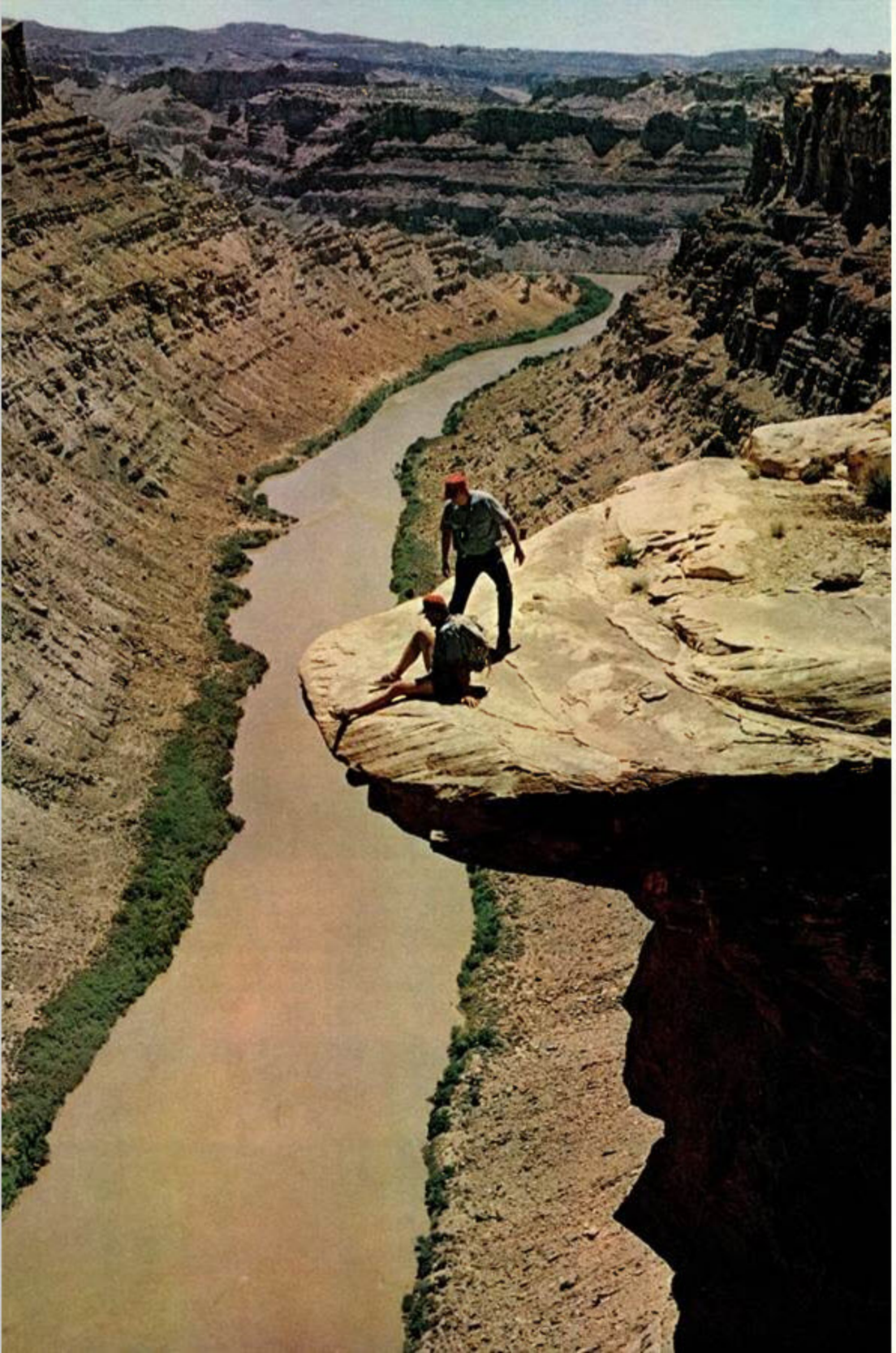


Realm of Rock and the Far Horizon

Canyonlands

By ROWE FINDLEY

PHOTOGRAPHS BY
WALTER MEAYERS EDWARDS
BOTH NATIONAL GEOGRAPHIC STAFF

TUGBOAT VANISHED before my eyes, a sure-footed packhorse and all our pots and pans gone rattling over the cliff.

But it was just a trick of the Utah terrain. The only pack trail into Horse Canyon looked like a leap into space until I got right on top of it. Then I could see the notch in the overhanging white rim, and below that the switchbacks looping down the boulder-choked slope to the canyon floor.

"No one rides this stretch of trail," packtrain master Art Ekker said. I gladly slid off a quarter horse named Buck and watched him drop from sight through the notch.

The Horse Canyon trail snakes for five miles into a labyrinth of rust-red, off-white, and cream-striped chasms called the Maze (following pages and map, page 74), a place of pristine solitude and mysterious ancient pictographs that flanks Canyonlands National Park in southeast Utah.

Now, just below the notch in the rim of the cliff, Tugboat had run into trouble. Two other horses—eyes wild and ears twitching—edged him toward the brink of a trailside ledge and a 200-yard plunge. Art's son A. C. Ekker soothed the frightened animals, praised them, got them safely off the ledge and down the switchbacks with the other horses.

Down into the dust their hard hoofs raised, we hoofless humans clambered, a party of nine led by Lorin J. Welker, district chief of the Bureau of Land Management, and his wife Eva. On the canyon floor we mounted our horses and strung out along the dry wash, past stream-bed dunes laced with lizard trails and signatures of the wind—swirling grooves traced by breeze-blown stems of grass.

Such packtrain trips are commonplace in Canyonlands country, where most roads ultimately turn into dubious trails, and travelers have frequent need of jeeps, horses, and their own two feet. Because the Green and Colorado Rivers meet in the heart of the park, the area also draws hundreds of boaters. To sample their experience I bucked through

Balcony in space rewards climbers with a breath-catching view of the Colorado River, a quarter of a mile below, surging through Canyonlands National Park in southeast Utah. On his epic 1869 descent of the river, Maj. John Wesley Powell gazed over this wilderness of rocks and exclaimed: "What a world of grandeur is spread before us!" The downstream vista looks toward a bend at Spanish Bottom—supposed ford of Spanish muleteers—where Cataract Canyon's thundering rapids begin.

Thirty-square-mile puzzle in sandstone, the Maze crinkles the landscape with swirling chasms hundreds of feet deep (following pages). No roads enter the labyrinth, site of a gallery of prehistoric pictographs (page 83) and part of a proposed 100-square-mile addition to Canyonlands Park. Hardy visitors go in by clambering and roping down the rock, or by following a tortuous horse trail.

CANYONLANDS NATIONAL PARK

"MOST UP-AND-DOWN terrain in the world," says a geologist of Canyonlands' rugged heart—roadless except for a few crude jeep trails. The Colorado and Green Rivers, cutting awesome, winding chasms, carved the park's dizzying vertical geography.

AREA: 257,640 acres. **HISTORY:** Prehistoric Indians, Spanish and Mexican colonists, and U. S. pioneers knew the area in turn but left little imprint. A uranium rush of the 1950's threatened but did not destroy its solitudes. Congress made it a park in 1964. **CLIMATE:** High, dry desert, with annual rainfall of 5-10 inches. Average summer daily high and low, 92° and 59° F., winter, 44° and 21° F. **FACILITIES:** Only two roads suitable for passenger cars enter the park's fringes, to Island in the Sky, a lofty mesa, and Squaw Flat. Campsites are few and primitive.

the Colorado's Cataract Canyon on a raft.

Everywhere I crossed the paths of earlier travelers—of padres and muleteers along the Old Spanish Trail, of Mormon missionaries and ranchers, of mountain men and explorers.

I crossed the trail of Capt. John N. Macomb, who in 1859 viewed the confluence of the rivers from a lofty overlook, but saw no way to descend into their deep-shadowed gorges. "I cannot conceive of a more worthless and impractical region," he said. A decade later one-armed Maj. John Wesley Powell solved the descent problem by boating down the Green. At the confluence he scaled a 1,200-foot butte and gazed out on a rock world, his journal records, of "ten thousand strangely carved forms . . . and beyond them mountains blending with the clouds."

I crossed paths with Butch Cassidy and his Wild Bunch, who robbed turn-of-the-century trains and banks with blasting powder and good humor, and with those wild uranium hunters of just 18 years ago, who filed claims that totaled three times the area of San Juan County, in which most of Canyonlands lies.

But this Maze trip was special. We climbed over sandy hillocks and found ourselves in cactus gardens abloom in lavenders, limes, and creams. Stone shapes like stetsons, boots, and Indian heads loomed on our skyline.

I was in a rock world, and I knew from an earlier visit with Dr. William Lee Stokes, Professor of Geology at the University of Utah, that it was virtually all sandstone. "Even the Arabian Peninsula can't match this country for quantity of sand, though most of it here is stabilized in stone," Dr. Stokes said. "Winds and rains dump the loose sand into canyons, and the rivers carry it downstream, keeping this basin from becoming a mass of dunes."

His geological imagery kept coming back to me, and now in Horse Canyon I suddenly saw the monolithic sandstone all around me as separate bits, attached to each other, grain by grain, in the time frame of the infinite.

Through the day Tugboat straggled far back, cropping the Indian ricegrass and overtaking us now and then at a clanging trot.

"Good old Tugboat," said A. C. "Nothing spooks him. That's why he carries the pots and pans."

But when it came time to camp, and the other horses were glad to shed packs in a grove of cottonwoods, Tugboat rattle-banged around in wide circles. At last A. C., on steady Senator Dan, lassoed Tugboat, showing us a bit of the roping style that helped win him the National Intercollegiate Rodeo Association title of All-Around Cowboy in 1967.

Soon Bates Wilson, Superintendent of Canyonlands Park and volunteer chef for our trek, was digging a fire pit, while his wife Robin unpacked the pots and pans and cousin Austin King gathered dry juniper bark for tinder. We feasted on steak as the last sunlight fled a high pillar of cloud.

Pictographs Reflect a Lost Way of Life

Next dawn my GEOGRAPHIC colleague "Toppy" Edwards had his photographic gear packed for an early start to the pictographs. While the others broke camp, he and I rode ahead up a winding chasm, entertained by the cadenzas of canyon wrens. Just when I was convinced we had taken a wrong turn, we rounded a bend and faced the huge pictographs on a sandstone wall.

In ancient inks of brown and ocher and black and white, an army of figures, some with shieldlike bodies, stood in ghostly array. There were desert sheep, flitting birds, and scurrying rodentlike animals.

But taking the eye from all other figures was a six-foot man with raised right hand, one finger giving root to a graceful tree, full as a spring-fed cottonwood. A tree of life?

"Nobody knows for sure," Bates told me as our party overtook us. "But these artists had imagination—and an eye for realism. Look."

His finger outlined a crouching figure on the stone, holding a pair of sticks (page 83, lower), and a similar figure nearby, wielding a sickle. From a talk I'd had earlier with Dr. Dean R. Brimhall, retired professor and government official-turned-archeologist, I knew the significance: These were the Maze's famed harvesters—the reaper with the sickle, the seed beater with the sticks—pictorial proof of prehistoric gathering of wild grain in the area. This picture gallery, together with a panel of towering figures in Horseshoe Canyon, 20 miles to the northwest (pages 82-83), would become part of Canyonlands Park under a bill before Congress.

Legend Clouds the Cassidy Saga

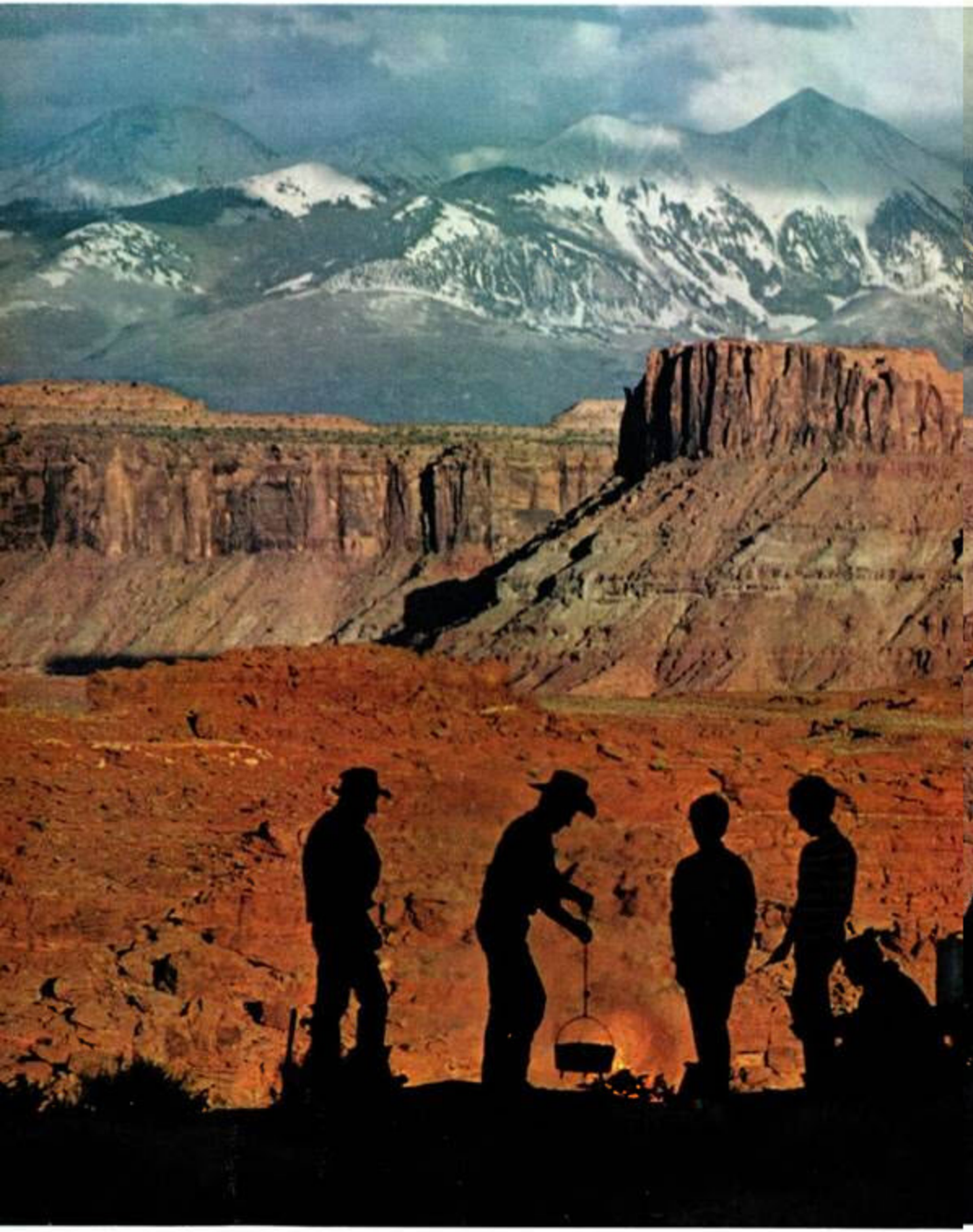
Almost everywhere I went in southeast Utah, I crossed the tracks of Butch Cassidy, rustler of cattle, blaster of railway express cars, bad gambler, and good guy. How he managed to fill all these roles is part fact, part legend, and laced through with a spirit of fun that tends to obscure the wrong that he did.

Not even Art Ekker, whose Robbers Roost Ranch is named for the fact that it encloses Butch's former hideout, could filter out the fiction for me. As he put it, "The hot-air merchants got too much of a head start."

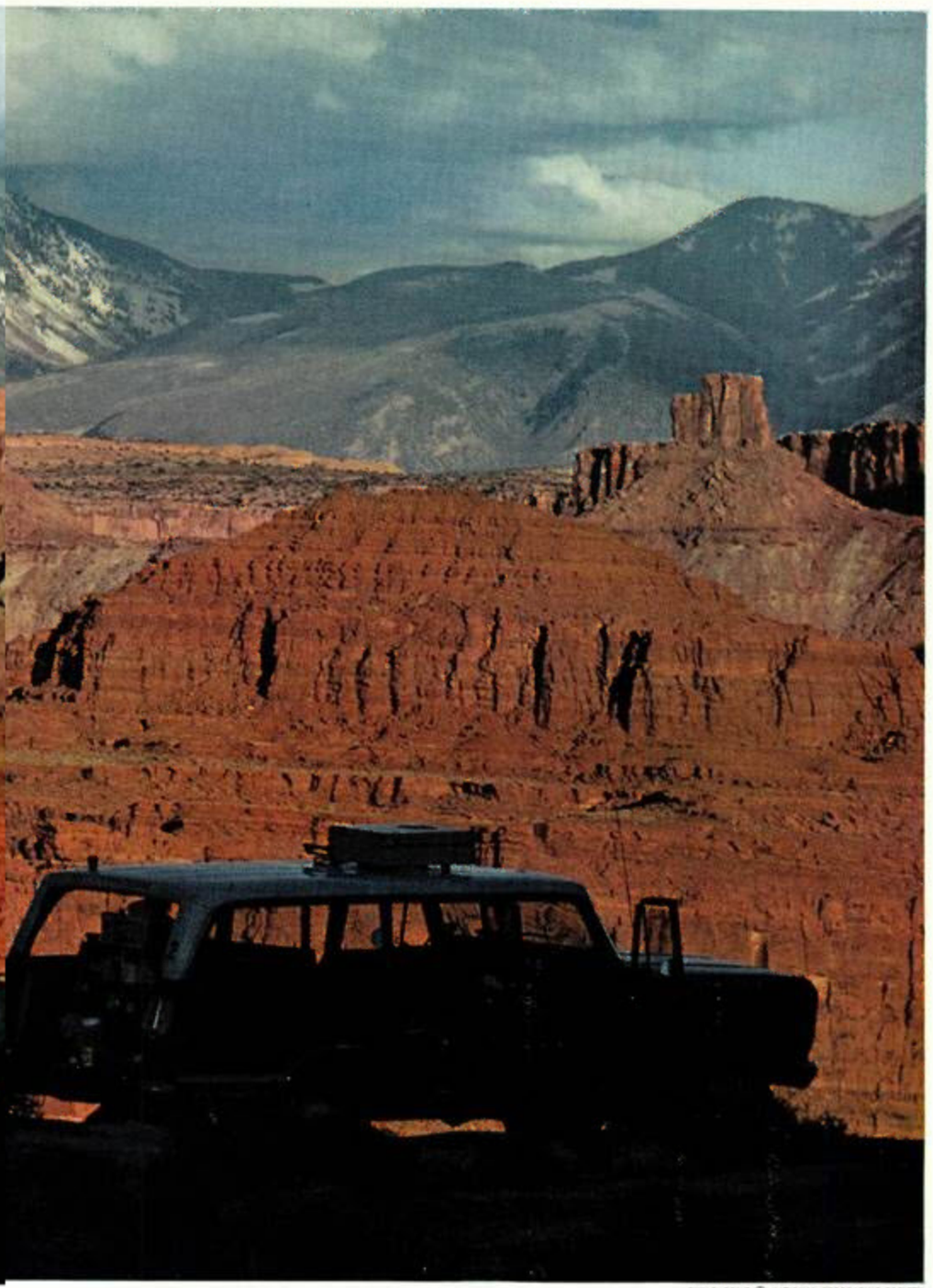
On our way to the Maze, Art detoured us to Robbers Roost Draw, a red-rock ravine with a slow-dripping spring where Butch Cassidy and his Wild Bunch hid out.

Butch was born Robert LeRoy Parker in 1866 into a respected Mormon family, and grew up on a ranch near Circleville, Utah. But as a teen-ager he found his hero in a hell-bent cowboy called Mike Cassidy, who taught him a fast draw and how to rustle cattle. One night Mike left—some say to Mexico to avoid a jail cell—but Bob had found his life-style and a new last name. He picked up the "Butch" elsewhere along the way.

The law in southeastern Utah had shallow roots in those days, and in the Robbers Roost country it had no roots at all. Zealous sheriffs hounded many a man into this redoubt of desperadoes. Elzy Lay, Silvertip, the Sundance Kid, and the murderous Kid Curry—all funneled here, and gradually they learned to let Butch mastermind their crimes.



White as the salt that inspired their name, the 12,000-foot La Sal Mountains begin to don autumn caps of snow. Spanish explorers christened the peaks in acknowledgment of the vast saline deposits that underlie the area.



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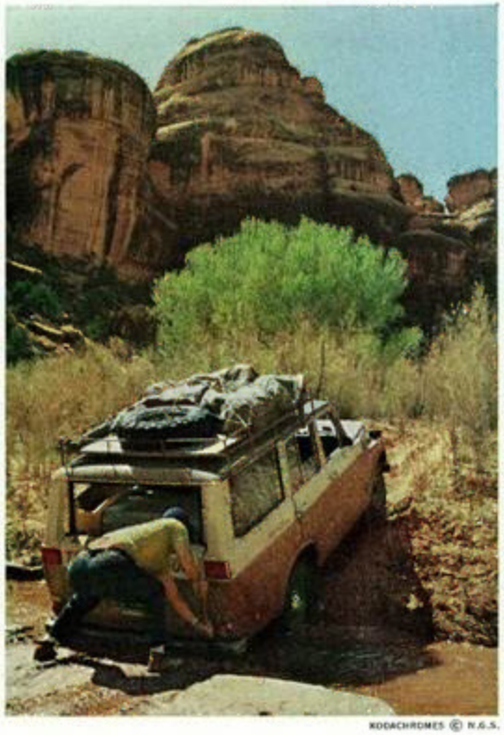
Between these campers, silhouetted at suppertime, and the distant red-rock plateau called Hatch Point, lies the Colorado River, locked in the windings of the awesome gorge that it cut as the land gradually rose through the eons.

Measuring a mighty pillar (right) in Monument Basin, whose stone spires have never been surveyed, hikers let out a line attached to a helium-filled balloon. A dead calm favored their project. The column's height: 305 feet.

Grotto with a skylight (far right) shelters the snaggled ruins of cliff dwellings. The Anasazi, or Ancient Ones, tilled corn in the valley below and retreated to the heights at night. Whether fleeing enemies or a prolonged and widespread drought, they disappeared from Utah by about 1300. This canyon, near Salt Creek, also shows evidence of disastrous flash floods at that time. Visitors today know the huge alcove as Paul Bunyan's Potty.

The price of solitude: digging out of a gravelly ford on Salt Creek (below), with pockets of quicksand as added hazards. Travelers who risk such obstacles find reward in a winding, watered canyon dappled with the generous shade of cottonwoods and studded with the abandoned cliff homes of the Anasazi.



KODACHROMES © N.G.S.

One evening when I was comfortably full of Art Ekker's "flour-sack biscuits" (mixed right in the sack without a bowl and baked in a Dutch oven), we lingered by the fire to talk about Butch, how people saw him as a sagebrush Robin Hood, whose bold holdups infuriated rail barons, whose thoughtful acts toward common folk won him many friends.

"Occasionally a rancher around here would find he had traded horses during the night with Butch and his boys," Art said. "The gang would wear out their own horses hightailing it from the law, and stop at his corral for fresh ones. If the horses they left weren't as good as they took, they'd trade back again later, or the rancher would receive some money to make up the difference."

There is a story that Butch took the time while fleeing with the $8,800 Castle Gate coal mines payroll to return a borrowed horse and pay a bar bill, and that during that same flight he stopped off at a dance in Hanksville and whirled a few reels with the ladies.

But finally the law did come to southeastern Utah, and Butch went to South America, accompanied by the Sundance Kid and an ex-schoolteacher named Etta Place. The robbing was good for a while, but at last a resolute band of Bolivian cavalry surrounded Butch and the Kid and cut them down.

At least, that's one story. Another has it that they somehow slipped away from this bloody trap and that Butch ultimately got back to the United States. Butch had become a legend, and legends are hard to kill.

The part of the legend that gives Art the most trouble has to do with buried loot.

"A lot of people are sure that Butch and his gang buried some money around Robbers Roost," Art told me. "Every so often somebody turns up with a map or a metal detector and wants to start digging. They've found a lot of rusty tin cans and old horseshoes."

Camp Chef Proves His Skill in a Blizzard

Art's ranch operation and Bates Wilson's style in running Canyonlands Park bore certain similarities, and the coincidence was not surprising in view of Bates's New Mexico ranch boyhood. His workaday outfit often includes faded jeans and scuffed boots; his drawl and easy smile mask a fierce resolve on behalf of wild things and wild places.

While serving as Superintendent of nearby

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Arches National Monument in the 1950's, Bates advocated a new park to protect the grandeur of the confluence country. When Congress made it a park in 1964, Bates was a natural to run it. He still runs Arches, too.

But if Bates had no other talents, his campfire cooking should win him fame. I became his booster during an April field trip with the park's advisory board of scientists. A driving wet snowstorm caught us in high piñon and juniper country at dusk, and Bates wheeled our jeep caravan into a wind-blunting hollow. Soon his fires made the Dutch ovens rattle and steam. Then through the swirling flakes came his cry of "Chiniago!"—from a Navajo word for "Come and get it!"

Gullet-warming coffee . . . sliced potatoes . . . blistering-hot biscuits. And as I held out my plate for beef, he asked me: "Rare, medium, or well done?" He's the only camp chef I know who can offer that choice in a blizzard.

Dune Buggy Conquers Elephant Hill

A traffic jam on Canyonlands' jeep tracks requires only two vehicles, especially if they meet on Elephant Hill, a mile of stone stairs that lead into the Needles, a forest of skyscraper-size stone spires.

Mitch Williams of Moab was piloting me down the steepest part of the hill in his four-wheel-drive station wagon when he abruptly turned off the trail. A dune buggy bounded past us up the slope like a grasshopper on roller skates, its oversize tires biting more sky than earth. The ruddy-faced driver, in his seventies, I judged, hunched close to the wheel, elbows straight out, wearing a smile of bliss.

Partisans of four-wheel drive regard Elephant Hill as their own. Dune buggies lack the traction and low-gearing to climb over it at a sane crawl. They must get up momentum, jeopardizing clutches, axles, and tires.

We didn't expect the resolute dune-buggy driver to make it, and stood ready to give him help and sympathy. But we swallowed our condolences as he rammed and skittered and hopscotched over the crest and out of sight.

And though veteran guides like Mitch question his prudence, they do not question the exhilaration he got from triumphing over such topography. In fact, Mitch himself resents each battle lost to the guardrail and the gentle grade. As we inched along one of Elephant Hill's switchbacks onto a rock turnaround shelf called the Turntable, Mitch pointed to sizable boulders placed near the brink to prevent a plunge should brakes fail. "Chicken rocks," snorted Mitch. "Somebody always wants to take the fun out of things."

Uranium Rush Makes Moab Boom

Back in Moab, home base for my Canyonlands wanderings, I paused on the eastern outskirts and found the city dump marring an otherwise splendid view of the snow-covered La Sal Mountains.

"But Moab doesn't have an unscenic spot for a dump," a friend told me. He's right.

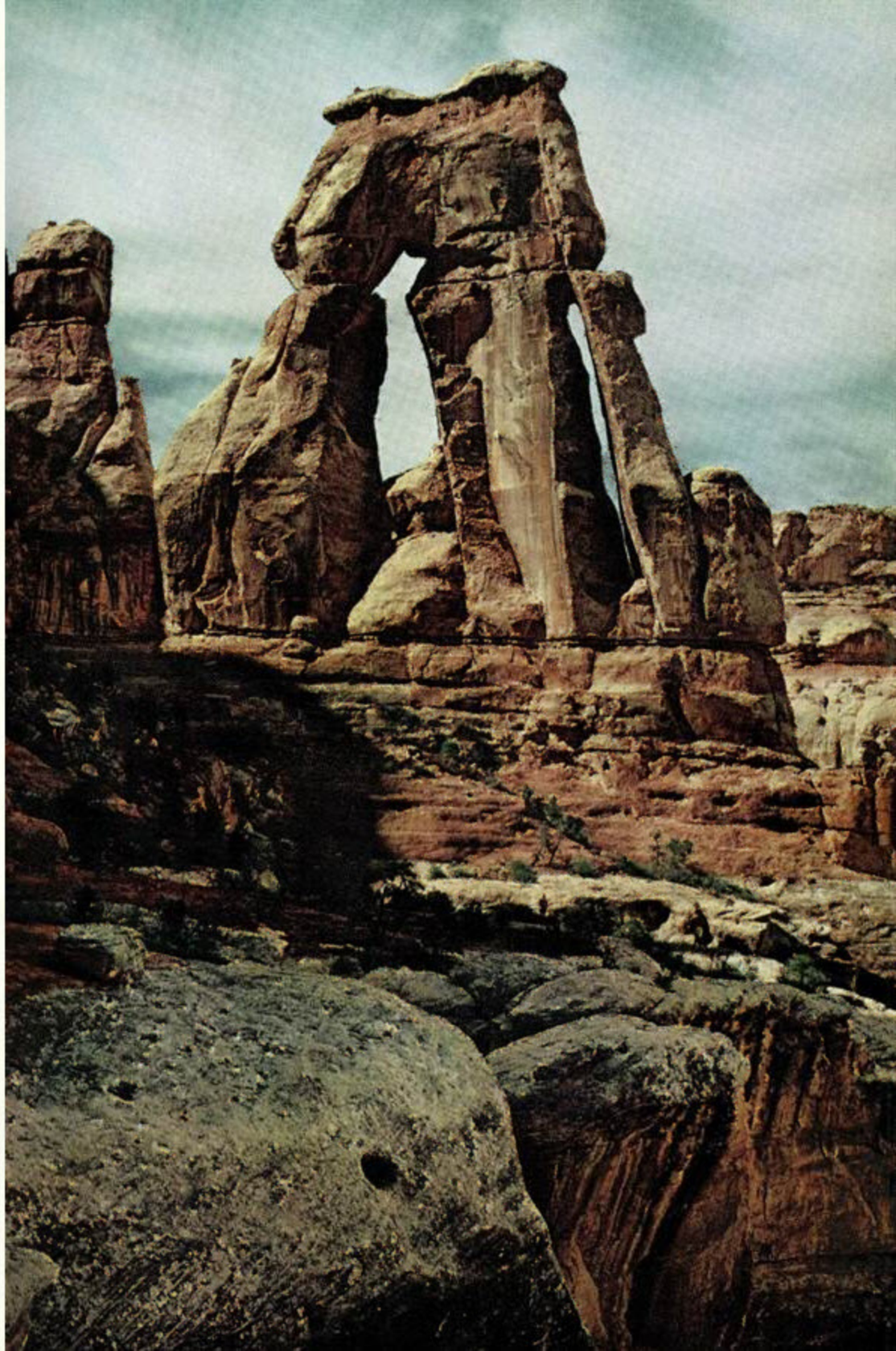
The first settlers found the scenery marred by unfriendly Indians. Mormon missionaries in the 1850's failed to convert the Utes, and were driven out of their Elk Mountain Mission. About 1875 other Mormons came from Salt Lake City, their New Jerusalem, and founded Moab as a ranching and farming center, like the Old Testament Moab a "far country" on the edge of Zion.

Moab became a pleasant cluster of stores, houses, peach orchards, and alfalfa fields beside the Colorado, complacent with its few hundred souls—until pandemonium struck in the early 1950's. Charlie Steen, a down-on-his-luck oil geologist, triggered it all in 1952 by discovering his famous Mi Vida Mine, a 60-million-dollar bonanza in uranium.

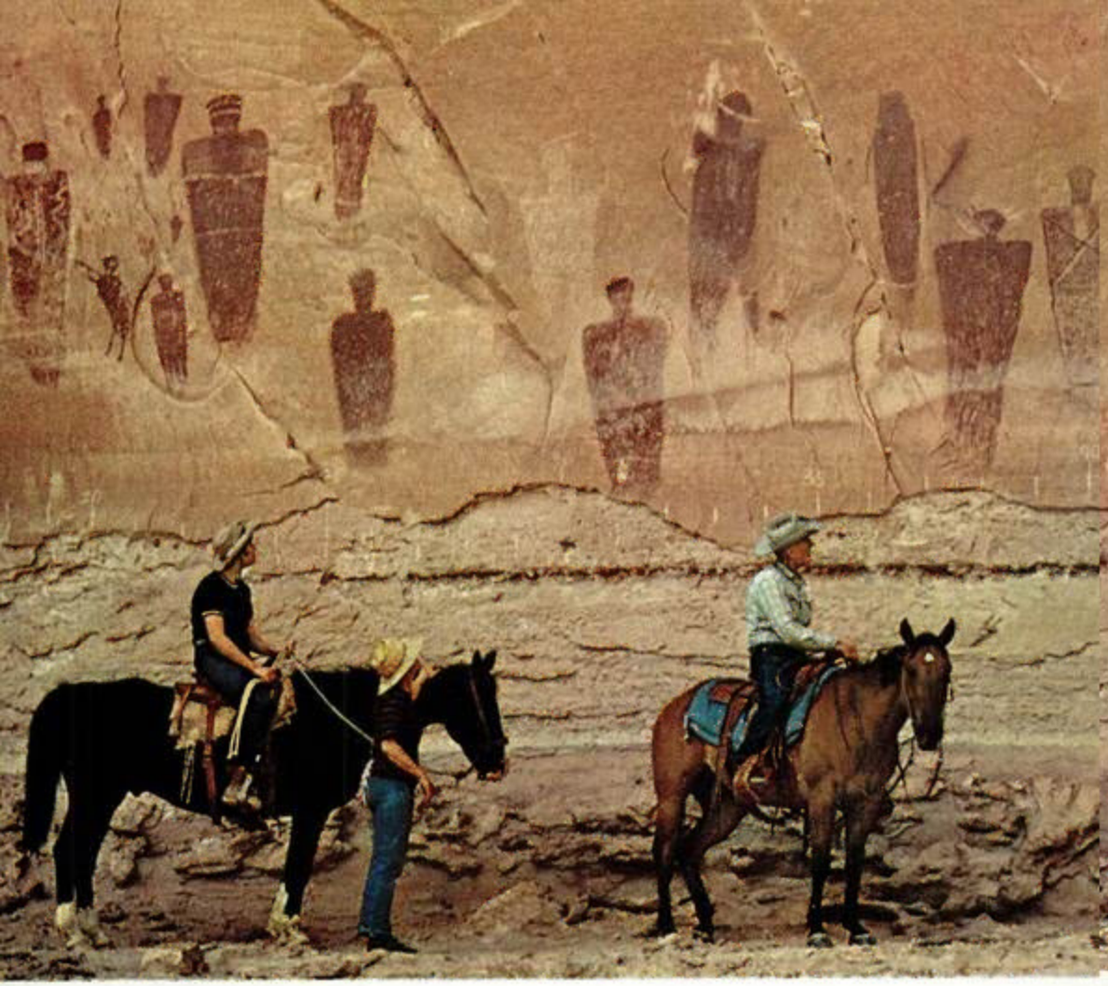
"This town went crazy," uranium buyer and mine owner Howard Balsley told me. "People lived in tents, cars, barns, and caves. You had to get in line to buy a meal or cash a check, and at times the general delivery line at the post office wound for half a block."

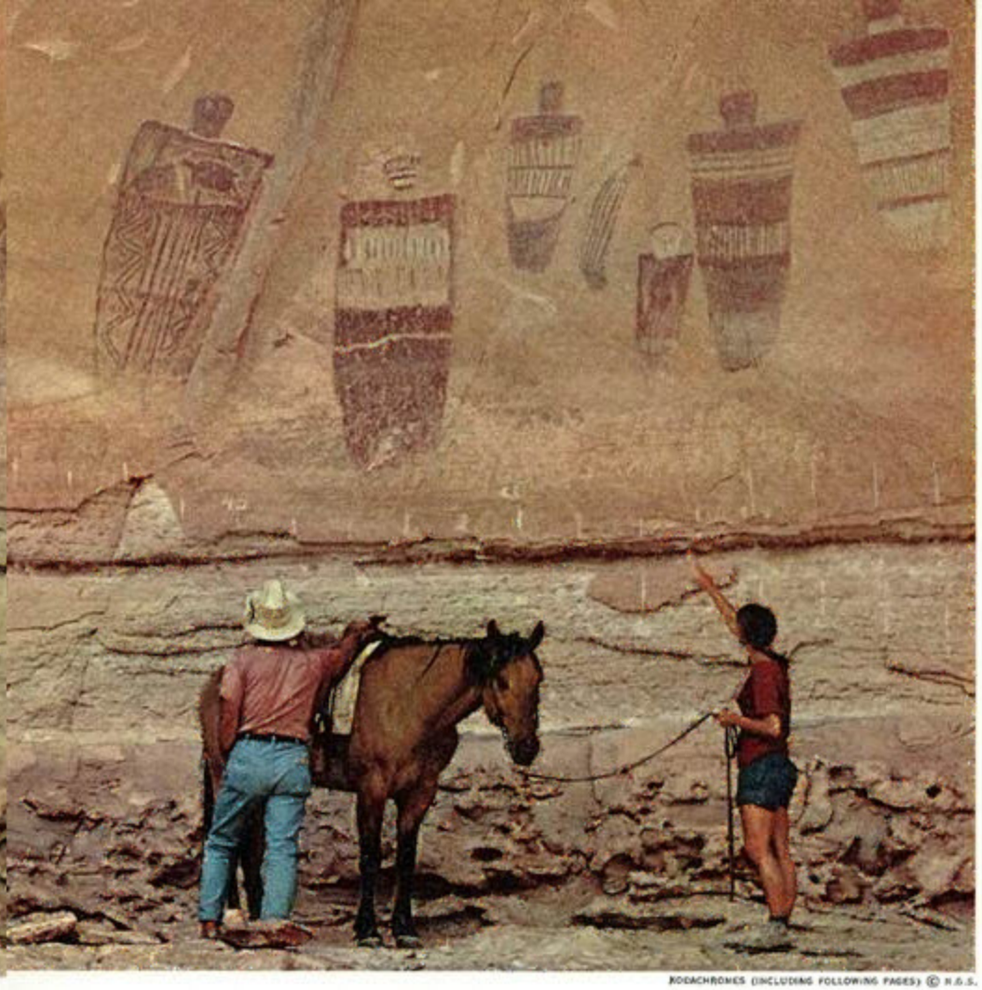
The lure of sudden wealth skyrocketed the population to 5,500.

"Moab became the 'city of millionaires,' " Mr. Balsley said. "We were supposed to have more millionaires per capita than any place in the world. One report put the number at 20, with me among them." He chuckled at the recollection. "I never did know more than three or four, and I wasn't one of them."



Profile reminiscent of Stonehenge gives a name to Druid Arch, whose 360-foot height dwarfs a human viewer. No one knows exactly how many natural arches bulk against the horizons of Canyonlands country; a young journalist from Moab, Utah, who investigates them as a hobby, has tallied 150. KODACHROME © NATIONAL GEOGRAPHIC SOCIETY





KODACHROMES (INCLUDING FOLLOWING PAGES) © N.G.S.

Ore seekers blanketed the country with claims, sometimes staking the same ground three or four deep. Speculators fattened; mining companies proliferated. Trading and prices of stocks outran comprehension.

Ore output caught up with demand by the late 1950's, and the boom tapered off. Some oil wells and a big potash mine helped take up the slack, but Moab lost about a thousand of its swollen population—and the fever edge of its faith in instant fortunes.

Upheaval Dome Resembles a Moonscape

Every property owner in Moab would be a millionaire if salt became dear, for only 300 feet or so of alluvial deposits separate their basements from solid salt.

A salt deposit as big as Maryland and as much as two-and-a-half miles thick underlies southeast Utah and part of Colorado, a legacy of landlocked seas. Lighter than the rock above it and like putty under pressure, the salt rises into faults or other weakened areas, warping the surface upward. Where subsurface water invades the salt, it dissolves, letting the surface drop. The vast cracks in the surface make it vulnerable to the erosive forces of sun, wind, rain, and the two great rivers, creating the land's fantasies in stone. Thousands of columns, spires, buttes, arches, alcoves, and headstanding stones pepper the map with curious names—the Doll House, Angel Arch, Six-shooter Peaks, Paul Bunyan's Potty (page 79), Land of Standing Rocks.

Salt in fact is responsible for Moab's valley; welling up along a fault, it lifted and fractured the surface. The salt later receded, leaving a vast sheer-walled trench.

But the salt's most awesome creation is a three-mile-wide bull's-eye called Upheaval Dome. "Some scientists thought it was a meteor crater," Dr. Richard B. Mattox told me.

Who were they? Little-known Indians painted a host of ghostly figures on a sandstone wall of Horseshoe Canyon perhaps a thousand years ago; a copyist added the chalk marks for scale in 1940. In the Maze, a stooping harvester (**left**) wields seed beaters, providing pictorial evidence of the reaping of wild grains by prehistoric bands west of the Colorado. Upraised hand gives root to a "tree of life." These picture panels would be included in the proposed enlarged park.

Pocket of rangeland in a world of rock, vast Chesler Park lured early cattlemen and bears a rancher's name. Spires called the Needles, some towering almost 500 feet, surround the 2,000-acre cow pasture (following pages).

Professor of Geology at Texas Tech University in Lubbock, Dr. Mattox has been studying Upheaval and similar salt structures since 1958. With him, his son Richard, and state parks board member Ed Claus of Moab, Toppy Edwards and I drove 40 miles west of town, then hiked up an ovenlike canyon and into the tortured heart of the dome, a sunken geological garble that made us feel we had somehow stepped onto the moon (pages 88-9).

Dr. Mattox's hand swept the surrounding walls of red cliffs towering 1,000 feet above us. "See the curves in their strata? That means warping under tremendous pressures. There's not enough shattering to support the meteor theory."

The warping thrust came from below, from a huge column of salt pushing upward into an area of weakness, bulging the surface into a mountain that cracked open and eroded into a crater of concentric stone strata, their jagged edges twisted upward. Hence the three-dimensional bull's-eye effect.

The central monument in this big hole is a lofty stone stiletto that stands within two degrees of the vertical.

"That's a piece of the White Rim, a sandstone formation that's generally about 1,800 feet lower than it is here," Dr. Mattox said. "And it usually lies horizontal."

Aquatic Life Thrives in the Desert

In another part of this rock country, I found Steve Romney, a doctoral candidate at the University of Utah, taking samples of the water in potholes for a census of the life they support. I peered into the pothole that held Steve's attention, and gradually was made aware of community upon community of life:

Beetles to the extent of 12 genera and 15 species, including some fast-moving ones called whirligigs that zipped in dizzying circles; a couple of species of mosquito larvae; three forms of waterbugs; and fairy shrimp, tadpole shrimp (page 89), water fleas, Mayflies, several species of gnat larvae. . . .

"Almost every time we check our potholes, we discover a new form," Steve said. "I think we'll find that the food chains here are like those in the sea, with algae as the basis. If you doom the algae, you doom everything. In a small pothole, a bar of soap might do it, or a cigarette butt. The balance is delicate."

Some of the pools are permanent, Steve said, fed by springs, but others fill only when it rains; yet even the temporary pools teem with life. Most forms survive in the egg stage, for months and maybe years. But others—the little gnat larvae and pupae—simply dry out in a brown, dusty crust on the dry rock until new rains refill the pothole. Then that brown crust begins to part and wriggle, a process that might be labeled "instant life."

Peril Lies in Petaled Beauty

If you come to Canyonlands in May, you will seldom be beyond sight and smell of flowers—pale and delicate evening primrose, sweet and yellow hollygrape, fields of globe mallow that stretch away into an orange blur on the horizon. But at least one bloom that caught my eye, a fetching cluster of purple, carried a sinister connotation.

"Locoweed is addictive to livestock, and unless they can be stopped from eating it, it is fatal," Dr. Stanley L. Welsh, Professor of Botany and Range Science at Brigham Young University, told me. "The popular name derives from the Spanish word for 'crazy,' to describe its victims; horses will struggle to find it on their dying legs."

Some locoweed is of the genus *Astragalus,* which has species by the score. Stan has found 20 that are "micro-endemics"—limited to small areas of southeast Utah. As we walked above Millard Canyon one day, he spied one species that prompted a story.

"In the 1880's, a botanist named Marcus Jones rode over Utah on a bicycle, studying plants. He found so many new *Astragalus* species that he ran out of names. Finally, in desperation, he named this one *desperatus.*"

One of the most minute forms of terrestrial life here offers tantalizing mysteries. A crumbly dark crust on the desert soil hardly looks alive at all, but it contains half a dozen to a dozen kinds of algae, fungi, lichens, and other minute plants called cryptogams.

"They obviously benefit mutually," Dr. Kimball T. Harper, Associate Professor of Biology at the University of Utah, told me. "But we're just beginning to understand how."

For example, some lichens contain algae that tap the air for nitrogen, that essential part of the life-sustaining proteins and a boon to the nitrogen-poor desert soil. Other algae secrete a sticky sheath that helps cement the crust—and retards erosion.

For my long-time friend Bill Taylor, park naturalist who spearheaded an environmental-education program in the area, this cryptogamic soil exemplifies the fragility of the apparently rugged land.

"One passage by a herd of cattle, or by human beings, can turn the crust into powder," he said, "leaving it vulnerable to the first windstorm or downpour. After this is explained to visiting school children, they begin tiptoeing whenever they come near it. If we can teach children to tiptoe now, maybe they will tiptoe for the rest of their lives."

The same water power that gouged the Green and Colorado Rivers' deep canyons also sweeps boats along at marvelous velocities, but in an easy and restful way where the brown surface flows velvet smooth.

But many river miles lack the velvet. Just three miles below the confluence, where the Colorado's canyon forms a bowl called Spanish Bottom, a big sign advises: "Warning. Dangerous Rapids. No boating beyond this point without a permit from the Superintendent of Canyonlands National Park."

Here Cataract Canyon begins. Beds of hard limestone and dolomite squeeze the muddy river into a churning sluice that races all the way to Lake Powell. The water boils over dams formed of boulders fallen from sky-high cliffs, of hair-trigger-balanced talus piles, of debris jetted in from side canyons by the incredible force of once-in-a-century superstorms. The result is 20 miles of fluid, frothing stairs that offer as breathtaking a ride as a man could want, especially in a 17-foot-long skittering bubble of a raft (below).

"I hope you enjoy getting wet," Dee Holladay greeted me as I piled my gear on the bank by his raft. I noted that Ron Smith, skipper of our four-raft expedition, wore a waterproof wrist watch and loaded a waterproof camera. Co-skipper Bill Belknap sealed his wallet in plastic. Toppy Edwards's camera cases vanished into a special waterproof hold. We seemed to be rigging for a dive.

Serenity Marks a Raft Trip's Start

But I was reassured as we pushed off from Potash, 12 miles below Moab, into a serene stretch of tamarisk-fringed river and drifted lazily around gooseneck bends.

KODACHROME (C) NATIONAL GEOGRAPHIC SOCIETY

Granary of a vanished people awaits a harvest that never comes. Marc Smith lifts the flagstone lid of a seven-centuries-old rock-and-adobe bin built by the Anasazi; the author and Loie Belknap Evans peer in. Rafts on the Colorado River, far below, will carry them through the rapids of Cataract Canyon.

KODACHROMES © N.G.S.

Yawning crater of Upheaval Dome, encircled by a rampart of rock, suggested a meteor impact to some geologists. But others found the explanation in the earth far below. Vast salt deposits, the residue of ancient seas, pushed upward through weakened rock, forcing the overburden into a dome that cracked and eroded, leaving the craterlike depression.

Out of the sere desert springs a bright bounty. Mutually beneficial colonies of algae, fungi, mosses, and lichens form a rough dark crust that enriches and preserves the soil supporting these ground-hugging daisies. Some lichens sustain algae that draw nitrogen from the air and deposit the much-needed element in the desert soil. Other algae secrete a substance that helps hold the soil together.

Tadpole shrimp lives in a water-filled pothole where ground temperatures often exceeding 140° F. dry out the stone cavities and bake them for months or perhaps years. In egg form or as dehydrated larvae or pupae, tiny aquatic creatures survive broiling heat—and winter's freezing cold—then wriggle into vigorous activity when new rains descend. One small pothole may shelter scores of species.

1 1/2 TIMES LIFE-SIZE; KODACHROME BY STEVEN V. RONNEY © N.G.S.

A fat beaver's plopping dive from bankside reminded me of the era of the mountain men who led the way into this land. Near the Green River in Hell Roaring Canyon, I had seen the autograph of one such trapper, pecked into the rock, "D. Julien 1836." I remembered my talk in the town of Green River, Utah, with his modern-day counterpart, "Beaver Bill" Howland, who first went trapping at the age of 15, some sixty years ago, and learned to love the river's freedom and the frontiersman's extravagance of speech: "You think this water is muddy? I've seen it so thick you could track a coyote across it!"

Learning to Like the Taste of Grit

The water under our rafts looked thick enough to hold tracks, and I was surprised to see Dee scoop up a cupful and drink it appreciatively. I was even more surprised to find I liked the taste, grit and all.

"A river man's gizzard gradually fills with sand," Ron told me, "and when he dies, he wills it to another river man, so none of the sand will go to waste."

The merits of this arrangement eluded me, but I forgot it in the discovery that our river experts were preoccupied by another aspect of the river—the amount of water.

Volume is measured in cubic feet per second, and spring snowmelt in the mountains had swollen the flow.

"Some forecasts say it will hit 40,000 cusecs," said Dee.

"What does that mean?" asked a hesitant member of our party, Marilyn Mitchell. She had been invited by her friend, Loie Belknap Evans, Bill's daughter.

"Above 20,000 we lose all control," Ron told her solemnly. Of course he was kidding —or was he?

With all this conditioning for panic, it was anticlimax to learn that the river's rise was far short of predictions, and that the skill of our raft crews made the difficult look easy and the hazardous seem safe.

Still, it was unsettling to reach Mile-long Rapid and read the inscription, now partly submerged on a rock, left in 1891 by James S. Best's prospecting expedition: "Hell to pay. No. 1 [boat] is sunk and down."

Mile-long's mile of heaving white water is prelude to three other mighty cataracts known collectively as the Big Drop. Many a boatman has gotten a rude dunking here. In an effort to express the demoniac wrath of the Big Drop's final rapid, somebody named it Satan's Gut.

Above each rapid there comes an instant when the swiftening current grips the boat irrevocably, and a roar that lately seemed distant and academic now overwhelms your ear—like being in the birthplace of thunder. You try to see the shape of the peril ahead, but as yet the face of the rapid is unknown, hidden by a speeding shoulder of water that expands ever closer.

Then the tossing rooster tails of spray, the geysers, the long smooth slides that end in splattering explosions, rise into view as your raft lips over the edge. Here and there brown swirls jet downward into huge sucking vortexes, holes in the river, that would have no trouble swallowing a boat.

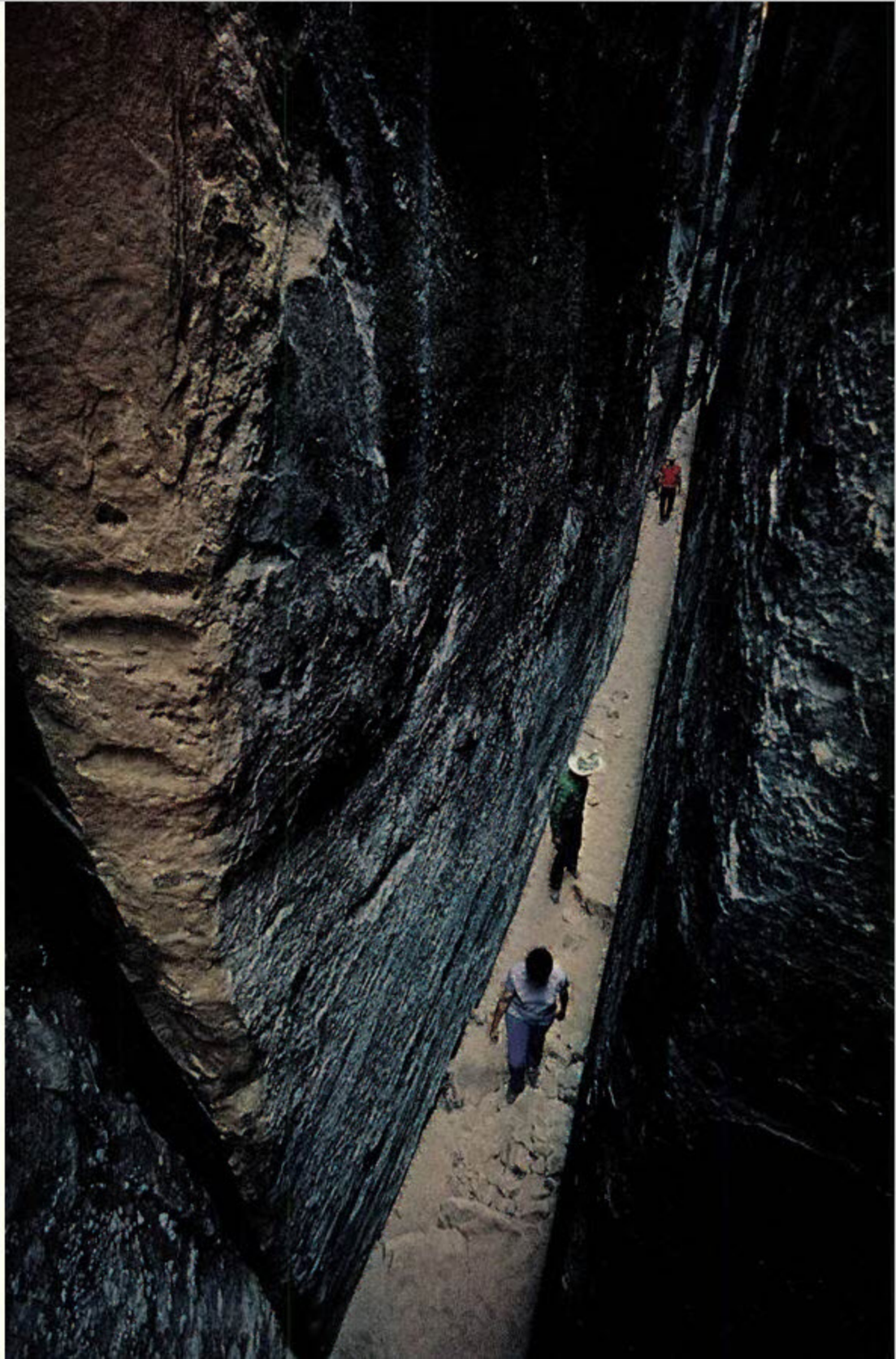
Your raft lurches ever faster, rams into tossing, jolting walls, buckles, whirls, takes water, but stays afloat. The horrendous holes dart harmlessly by. "Grab those buckets and bail!" shouts your boatman. You retract your fingernails from your palms, thus freeing your hands from the safety ropes, and bail furiously. Already you hear the next rapid's roar.

Stealthy Caller Evokes Good Will

At last a turn in the canyon shot us from the final rapid into the gathering stillness of Lake Powell, and I suddenly had a mental picture of formerly sunlit white water now locked in blue silence far below, as in a tomb. And I resented the man-made lake.

During our final night's camp beneath a star-paved sliver of sky in Dark Canyon, we had a stealthy visitor. Next morning we saw the 2½-inch paw prints in damp sand of a cougar that had slipped down from the heights for water. He came within 30 feet of our dying campfire, and the realization of his seeming brashness gave us a kind of joy. To find a wild creature still uncowed by man's long history as a destroyer seemed a hopeful sign as we try to learn better ways.

"I hope he enjoyed his drink," said Ron. □



Passage through solid rock, a rupture called the Joint Trail leads from Chesler Park to Chesler Canyon, half a mile away. Subterranean water, dissolving salt deposits far below, undermines the surface and helps create such fissures and fantasies in stone.

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