

Desert Calendar

- Jan. 28-Feb. 3—Open golf tournament, Tucson, Arizona.
- Jan. 31-Feb. 1—Sierra club official hike, Rabbit peak, Santa Rosa mountains. Meet at Borrego, California. Bill Henderson, leader.
- Jan. 31-Feb. 1—Second annual Thunderbird Ski meet, Arizona Snow bowl, Flagstaff, Arizona.
- Feb. 6-7—First annual Carrot Festival of Imperial Valley, Holtville, Calif.
- Feb. 7-8—Sierra club, All-American canal camp and desert hike in Orocopia-Chocolate mountains area. Camp in desert wash about four miles from Mecca. Jim Gorin and Russell Hubbard, leaders.
- Feb. 8—Snow Basin giant Slalom, Snow Basin, Utah.
- Feb. 9—Intermountain jumping championships, Ecker Hill, Utah.
- Feb. 10-15—Livestock show, Tucson, Arizona.
- Feb. 11-15—Riverside County Fair and Date Festival, Indio, California.
- Feb. 11-15—Pima County fair, Tucson, Arizona.
- Feb. 14-15—Third annual championship Silver Spur rodeo, sponsored by Junior chamber of commerce, Tucson, Arizona.
- Feb. 15—Intermountain invitational giant slalom, Ephraim canyon, Ephraim, Utah.
- Feb. 20-22—Annual Ski Carnival, Arizona Snow Bowl, Flagstaff, Ariz.
- Feb. 20-23—23rd annual Fiesta de Los Vaqueros, Tucson, Arizona.
- Feb. 21-22—University of Nevada Winter Carnival and Pacific Northwest Intercollegiate meet, Mt. Rose, Nev.
- Feb. 22—Lecture, "National Parks and Monuments of the Southwest" by Frank A. Schilling, Southwest museum, Highland Park, Los Angeles, California.
- Feb. 22—Intermountain cross-country championships at Brighton, Utah.
- Feb. 28-29—Four-way invitational winter sports meet, Provo, Utah.
- Feb. 28-March 7—Imperial County fair, County fair grounds, Imperial, California.
- Feb. 29—Annual Dons club Trek to Superstition Mountains, from Phoenix, Arizona.
- Feb. 29—"The Jarabe Dancers," lecture, Southwest Museum, Highland Park, Los Angeles, California.
- Each Saturday until June 1 — Palm Springs Desert Breakfast rides, with guests of all Palm Springs, California, hotels participating.
- Each Saturday until June 1 — Palm Springs Sunfun hikes to study plant life and geology of Colorado desert and mountain canyons. Desert Museum naturalists give explanatory talks. Palm Springs, California.



Volume 11

FEBRUARY, 1948

Number 4

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RANDALL HENDERSON, Editor. BESS STACY, Business Manager.
HAROLD and LUCILE WEIGHT, Associate Editors.

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Norman Nevills and his lining crew lowered the boats along the edge of Lava falls with ropes, while the passengers portaged the cargoes on shore.

Grand Canyon Voyage . . .

At Lava Falls the Nevills river expedition faced its most hazardous water—but passage was made by portaging the cargo and lining the boats along the edge of the rapids. Then after conquering the most treacherous obstacle at this stage of the river, one of the boats nearly capsized in a little riffle below. This is the concluding chapter of Randall Henderson's story of his voyage through Grand Canyon with the 1947 Nevills expedition.

By RANDALL HENDERSON

THE ENTRANCE to Havasu canyon is a narrow slit in the Grand Canyon sidewall. The turquoise blue water which enters the Colorado river in the Havasu tributary was deep enough for our boats, but so narrow we had difficulty using the oars. But the current was sluggish and we were able to propel ourselves 150 feet back into the crevice, to a point where the cliffs open up and the stream is bordered by a grassy floor wide enough for our camp.

This is a lovely spot. The lower sidewalls are coated with lime. Cascading down between them, with a green border

of grass and water cress is one of the most colorful streams in western America. In quiet pools the water is green, and then it tumbles over a miniature waterfall and is churned to a milky turquoise blue.

A small tribe of Indians—the Supai—live seven miles upstream. But they seldom come to the river, and there is no trail. I hiked from Supai village to the Colorado with 15 members of the Sierra club in 1942. We waded much of the way, and clawed our way through dense thickets the remainder.

With a cascade of blue-green water at our feet, a narrow slit of sky overhead, and

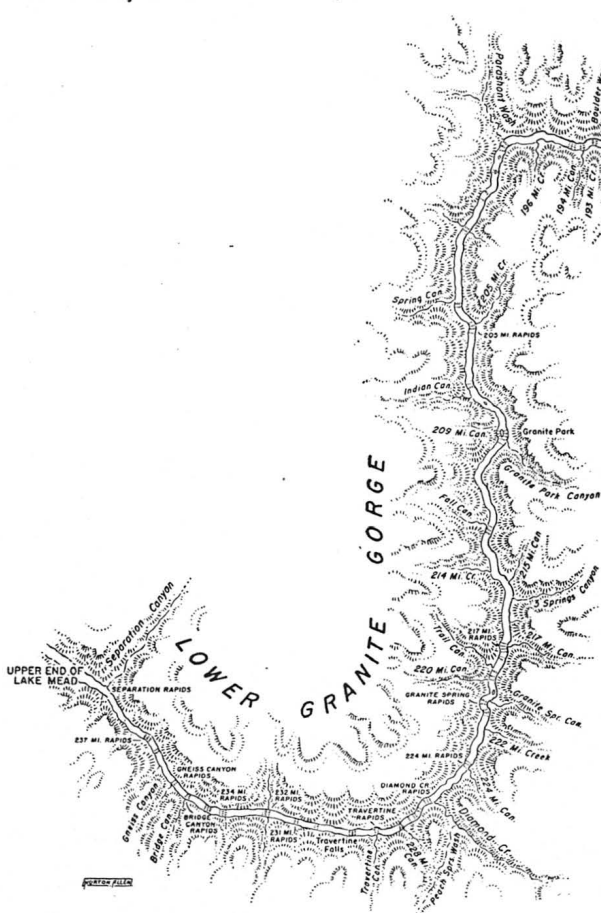
sidewalls that blend from pure white to dark brown and grey between, this truly is a colorful setting, and we could have enjoyed this camp for days if our schedule had permitted.

We had rainbow trout for supper—the fish Otis Marston caught that morning at Tapeats creek. But the perishable items in our commissary were gone. We left Phantom ranch with many loaves of bread, but the last of them had turned moldy. The remaining bacon, cheese and eggs were hardly edible. But while some items in our food stock were low, we still had an ample supply of others.

Major Powell wrote that at this point his rations were reduced to a little musty flour, some dried apples, and an ample supply of coffee. In our boats were many cans of canned ham, fruit and fruit juice, biscuit and flapjack flour, cream of wheat, potatoes, peanut butter, pork and beans, pickles, tomatoes and milk and coffee and tea. Despite the moldy bread we were liv-

Sleeping space was rather limited here, but each of us found a ledge or a grassy corner big enough for a bedroll, and instead of the roar of rapids we had the tinkling music of Havasu creek as our bedtime serenade.

Most members of the party had sleeping bags. At the last minute before leaving Lee's ferry I discarded mine, and I never

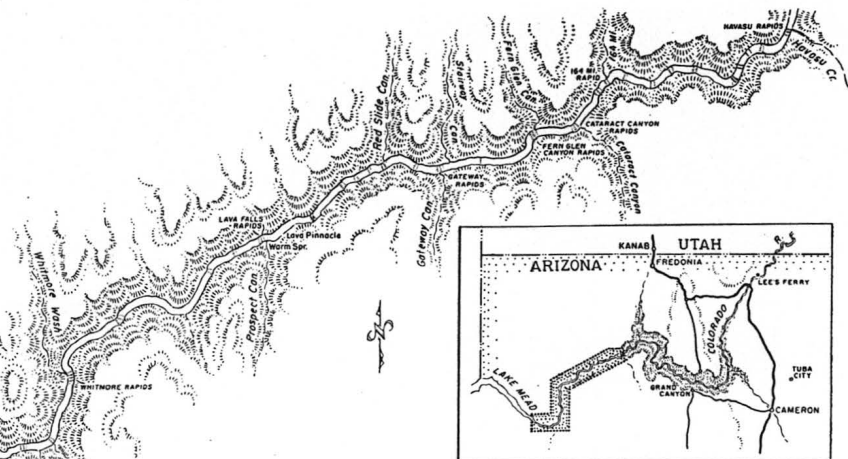


We were up at six next morning and after a breakfast of buckwheat cakes, spent three hours climbing the walls and exploring the lower Havasu. Norman and Joe climbed to a high point upstream from the Havasu-Colorado junction where five well-constructed rock cairns could be seen, but found no records in them. Some one dared Norman to jump over Havasu creek from sidewall to sidewall at the top of the narrow slot through which we had brought the boats, 40 feet above the stream. Before the bantering had ended, Norman, Garth, Al and Kent all jumped the 10 or 12-foot span. Then Joe Jr. jumped from a ledge 30 feet up on the sidewall to the creek below and swam out.

at 10:10 we departed reluctantly from our little shangri-la in Havasu canyon. We ran Havasu and 164-Mile rapids without stopping, and then had lunch on a bar above Cataract creek. Joe Jr. ran the *Wen* through Stairway creek rapids, all the boats carrying full passenger loads. We ran Red Slide rapids easily and after navigating six heavy riffles, passed a huge plug of lava out in the stream, known as Vulcan's Forge.

One of the questions I had intended to ask Norman at the end of the trip was which, in his opinion, was the roughest rapid on this voyage through the canyon. But when we came to Lava Falls I knew the answer. At this stage of the river, Lava Falls is the daddy of them all.

According to the geological map the river drops 25 feet in a half mile, which is less than at some of the other rapids. But as Norman put it, "It isn't the depth of the fall that counts, but the manner of doing it." In most of the rapids Ol' Man River rolls over submerged boulders, creating a hump on the surface of the water



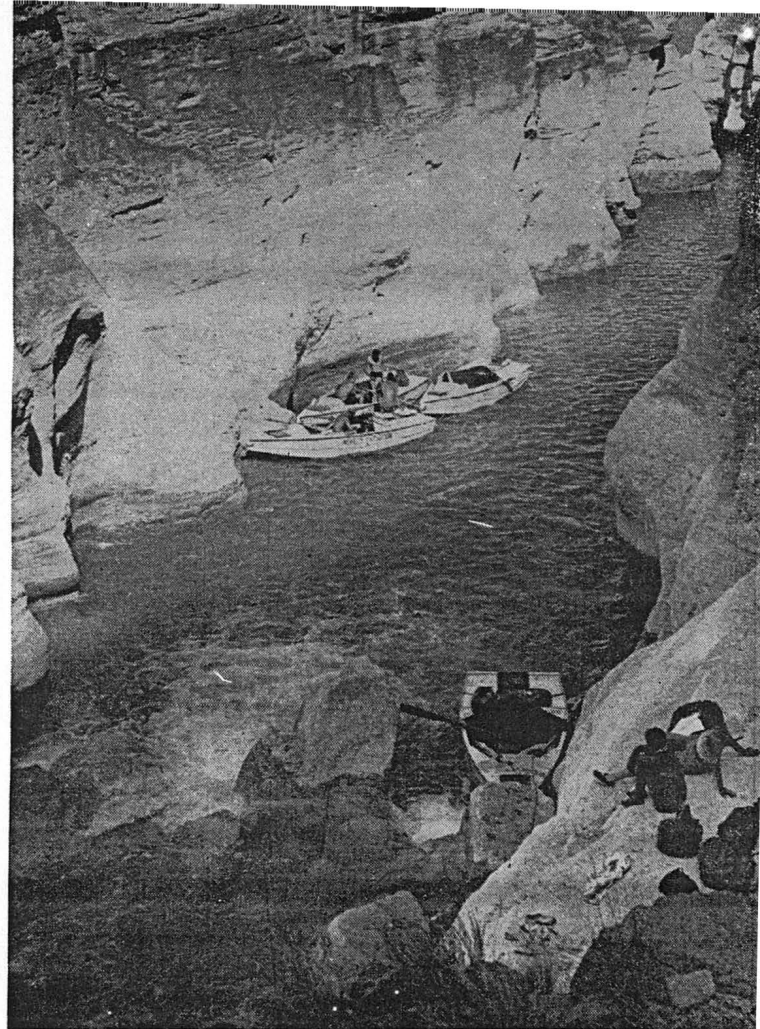
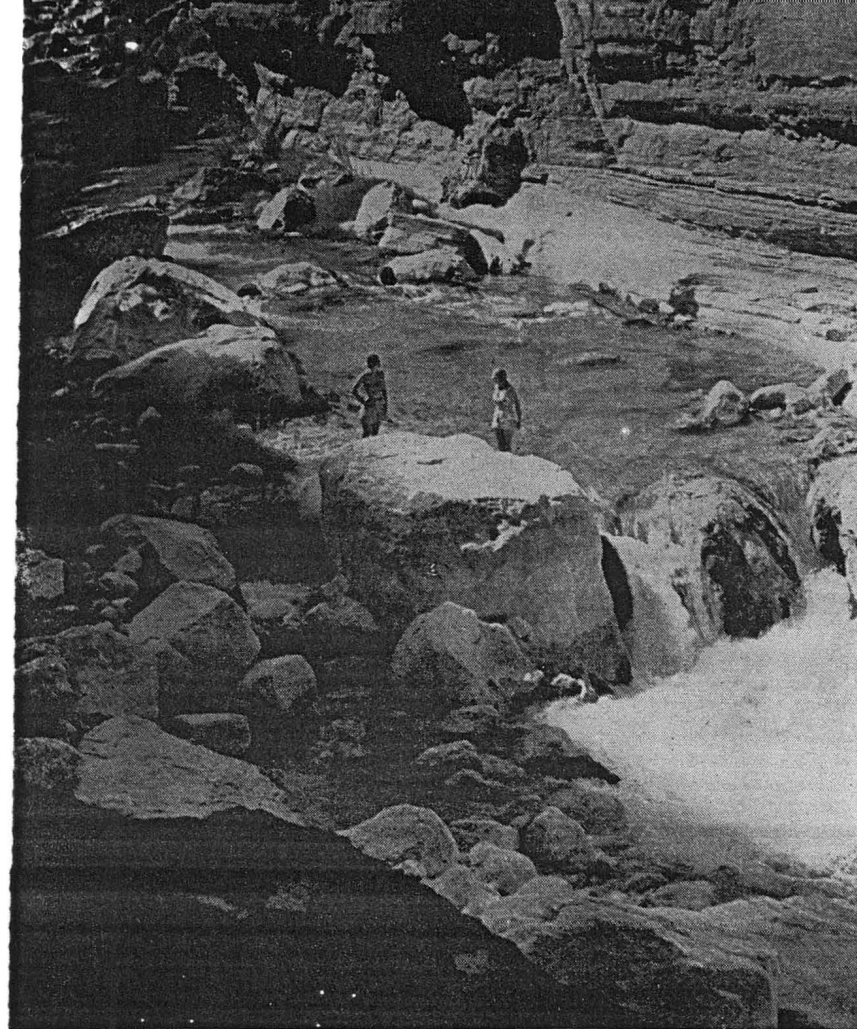
Norman ran this rapid in low water in 1940, but at this high stage it looked like suicide to attempt it. "We'll line this one," the skipper said, after looking it over.

There was a narrow beach above the falls, and some clear water seeping out of the bank. It had the sweetish taste of lime-water, but was palatable, and we had a comfortable camp that night, always with the roar of the rapids in our ears.

A visitor arrived during the evening, the first stranger we had met since leaving Phantom ranch. John Riffe, custodian of Grand Canyon national monument on the North Rim—not to be confused with Grand Canyon national park—hiked down from his headquarters at Tuweep, at an elevation of 4775 feet, to spend the night with us. He had been advised in advance of our schedule and the rangers at Phantom ranch told us he probably would be with us for a few hours.

We were camped on the south shore, but when we saw him making his way down over the lava talus on the north side just before dusk, Norman rowed across and brought him to camp. From him we learned the geological history of this sector of Grand Canyon. The north wall here is solid lava, which according to geologists, probably came from a now extinct crater on the North Rim known as Vulcan's Throne. Three times in geological history Vulcan has erupted and sent a great stream of molten rock into the gorge at this point. One can imagine the thunderous hiss of steam and the great clouds of vapor which filled the skies when those streams and avalanches of hot lava poured over the rim and into the water of the Colorado.

At each of those periods the canyon was partially plugged, and reservoirs created above. But eventually the scouring action of the silt-laden water cut its way through the obstacle. The action was hastened by the fact that Nature doesn't take as much pains with its lava dams as does a 20th



Where the voyagers camped overnight beside the blue-green water near the mouth of Havasu creek. The white coating on the lower sidewalls is lime deposited by the stream.

century engineer when he creates a structure such as Hoover dam. These natural dikes of lava lacked the deep bedrock foundations and the recessed abutments of a man-made structure. And as the lava hardened it cracked and left crevices through which the water seeped, and hastened the process of destruction. We saw blocks of prehistoric lava clinging to the granite and limestone and sandstone walls during the remainder of the trip all the way to Lake Mead.

But Nature has not yet finished the job of cutting a smooth floor for the river at Lava Falls. And the side canyons are still bringing in storm debris to block the channel.

We slept on the beach that night, and next morning Lava Falls looked as ugly as it had the day before. And yet, despite the chaos of mighty waves out there in mid-stream, I believe that if Norman had taken a vote of the passengers and boatmen as to whether it should be run, or the boats lined down the side, the decision would have been almost unanimous for the ride through. Such was the confidence the members of this expedition felt in their

boatmen and the sturdy 16-foot cataract boats.

But we did not argue with the skipper. He knows the river far better than any of the rest of us will ever know it. And so in good spirit we began the arduous task of portaging food and bedrolls and camp equipment down along the rocky shoreline a third of a mile to a point below the falls.

Norman organized a lining team composed of Kent and Joe Jr. on the tow rope and Garth and John Riffey on the stern rope. As captain of the team he remained in the boat to guide it over and around the rocks on the edge of the torrent. In fast water the crew on the upper rope held the boat back, and when it had to be skidded over boulders that projected above the surface the ropemen below pulled it along. The rest of us were making trip after trip with our packs along the shore.

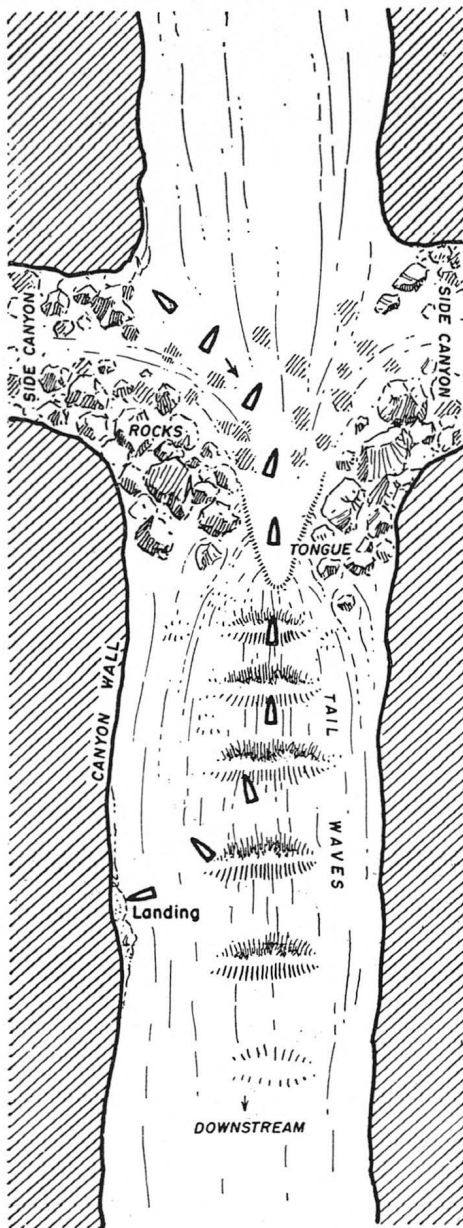
At 11:00 o'clock the boats were through and reloaded, and we dropped downstream a half mile to a sandbar where we ate lunch in the shade of an arrowweed thicket. The thermometer read 108 degrees.

One drinks literally gallons of water

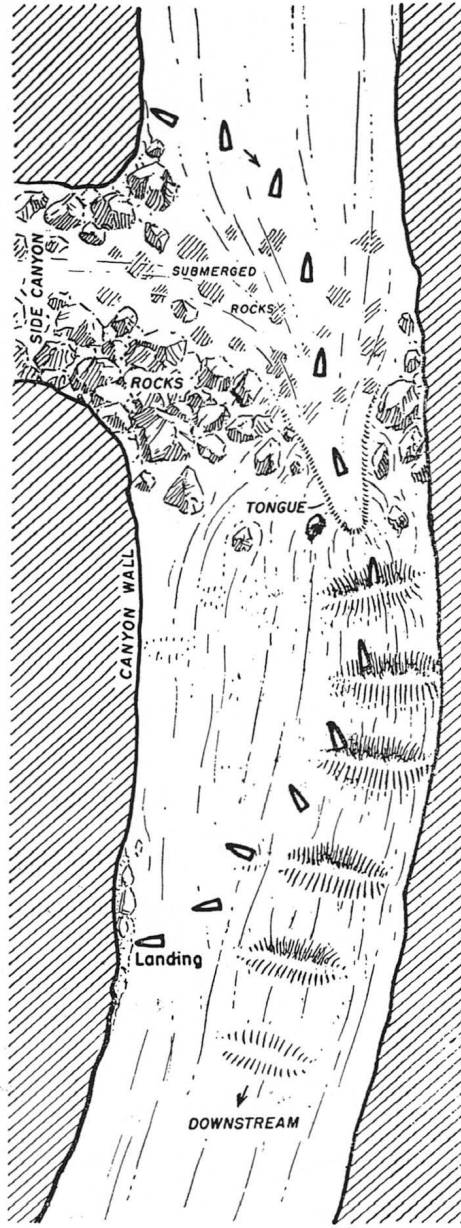
each day in such temperatures, and we were taking salt tablets to keep our systems from being drained of their minerals. There are some pretty springs gushing from banks of maidenhair ferns below Lava Falls. The water was clear, and looked most inviting—but its temperature was 79 degrees, and it tasted so bad we preferred to drink the muddy 79-degree water that ran in the river. On the map this place is marked as "Warm Springs" and there have been widely varying reports as to its temperature. We checked it with two thermometers at 79 degrees.

We were grateful to John Riffey for the help he had given us in the lining and portage job. Norman invited him to ride through a riffle just below our lunch camp and get a sample of white water navigation before starting the return hike up the cliffs to Tuweap.

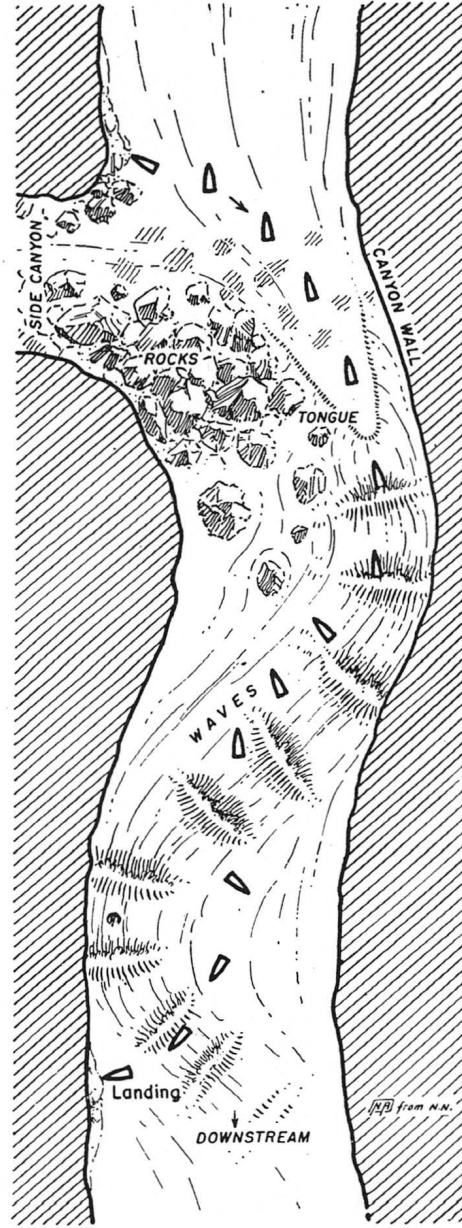
Before we shoved off, Norman told Al and me to put on our life belts. Then he gave one to John, showed him how to put it on, and then slipped into his own kapok jacket. I thought it rather strange we should be putting on our preservers for a



Straightaway rapids.



"C" rapids.



"S" rapids.

These sketches by Norman Nevills and Norton Allen show the technique most commonly used on the Nevills expeditions to run the boats through the three types of rapids. There are many variations, depending on the height of the stream and the rocks, both submerged and protruding, but the theory generally is to follow the main tongue or "V" to the point where it breaks into huge waves, and then get out of the waves as soon as practicable. The boat goes stern first so the oarsman is always facing his greatest danger, whether it be rocks, holes, waves or sidewall.

lowly riffle with only three-foot waves. But the skipper usually knows what he is about, and we did as we were told and asked no questions.

We headed into the riffle, but instead of "stealing" through in the usual manner Norman turned the boat broadside just in time for one of those 3-footers to curl over and land on top of us. The weight of the water on one side tipped the boat on edge and for a moment I thought we were going to turn over. Al and I were out in front on the stern deck and the wave lifted us clear off the wood and we were hanging by the ropes. I was on the low side, and if Al had lost his grip and come tumbling

down on top of me we would both have gone overboard.

But just at the critical moment Norman dropped his oars and leaped to the upper side, and I think his added weight there kept us from capsizing. The boat righted, full of water to the gunwales. Instinctively, we began fishing in the bottom for something with which to bail. Al found a bucket down there, but when he tried to bring it up Norman's foot was wedged in it. But we drifted into smoother water and by the time we had reached the shore had bailed at least a half ton of water out of the cockpit.

"I wanted to give John a little sample of

rough water," Norman admitted afterward, "but I didn't intend to come that near pitching you fellows overboard." In one little riffle, John Riffey had come closer to a capsize than any of us had experienced on all the rest of the trip.

Below Lava Falls we had an exciting moment when we spied the yellow coloring of what appeared to be a boat lodged among the weeds on a sandbar. "May be Roemer's boat," Norman yelled, and started pulling for the shore. We had been looking for the wreckage of such a boat all the way down from Phantom ranch.

The story: An Austrian known as Charles Roemer left Lee's ferry October



Members of the 1947 expedition at the Separation rapids plaque installed by Julius F. Stone.

19, 1946, with only meager provision, stating he was going to run the Grand Canyon rapids in his rubber boat. He was last seen floating past the foot of Bright Angel trail October 24, and his fate remains a mystery.

We had seen footprints on the sandbar at one of the rapids on the way down and had every reason to believe they were made by Roemer, but we found no other evidence of his passing. Norman was first to reach the yellow something in the weeds—and he turned back with an exclamation of disgust.

"It is a boat," he said, "but not Roemer's." It was a small wooden skiff, tied to a mesquite tree, and probably had been used by fishermen coming down Whitmore canyon. We left it as we found it.

We camped that night on Whitmore's bar, and the following day after running only minor riffles arrived at the mouth of Spring canyon for an overnight stop. There is a fine spring a half mile up the side canyon, and Kent and Garth and I fought our way through a jungle of willow and arrowweed and mesquite to reach it. The temperature was 122 degrees, but it sprinkled just after dark and cooled the air enough to provide a comfortable night's rest.

There were clouds of bats in the air at dusk.

We were off at 8:00 in the morning. Fifteen minutes later we ran 205-Mile rapids without stopping. It was short and choppy. Then came Granite Park rapids which was an easy one, and at 10:35 we reached 217-Mile rapids. Although not a major rapid, it looked rough and we pulled in above to look it over.

Norman studied it awhile, then turned and said: "This is going to be Dub's day. I'll run the *Wen* through. Joe, you follow in the *Mexican Hat*. Randall, you bring the *Sandra* through, and Al will follow in the *Joan*. The rest will stay here on the rocks and watch you landlubbers do your stuff."

I wouldn't have been more surprised if Norman had told me to jump in the river and swim down to Lake Mead. I am neither a good swimmer nor an experienced boatman. And Norman knows it. I am like Dick Wick Hall's frog that lived on the desert so long it never learned to swim. Oh, I can paddle around a little, and I know which end of the oar to use as a propellor. But in the water I am a Dub with a capital "D."

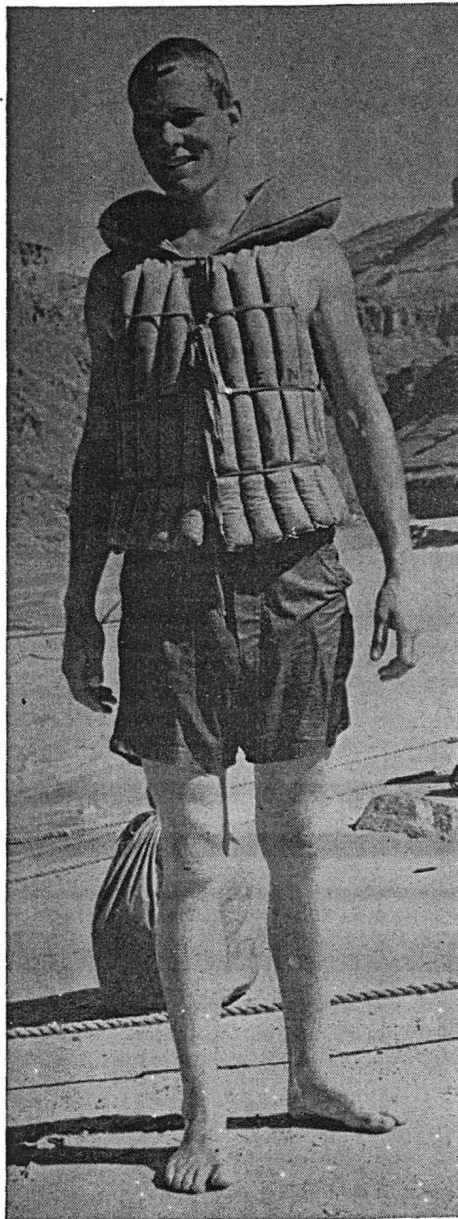
I grinned at Norman—and then I re-

alized he was not kidding. So—if he was willing to trust the newly-christened *Sandra*, the pet of his fleet, in my hands, I would surely do my best to deliver it right-side-up at the bottom of the rapids.

I stood on a high rock and watched Norman glide down the tongue of the rapid, carefully avoiding a big rock where the water tumbled over into a swirling eddy near the tip of it, and then pull like a sonuvagun to keep out of the 8-foot waves that could easily dash the boat into the granite wall on the opposite side. I've watched Norman take his boat through a hundred of those rapids on the San Juan and Colorado rivers. I knew the theory of it perfectly. But I wondered if those pesky oars would do what I told them to do.

Joe Jr. came through without trouble and then I made my way up the shore to where the boat was moored above, with much the same feeling I had at Kelly field in World War I the first time the instructor got out of the plane and said: "Now you take it off and fly around the course."

I overlooked no detail. I had observed that before Norman and Kent tackled rough rapids they always reached over the side of the boat and washed their hands



Joe Desloge Jr. in the kapok life jacket in which he swam Deubendorff rapids. Later he and Otis Marston went through without preservers.

and face in river water, and then took a drink of it. I don't know just what significance there is in that little ritual—but if there were any fetishes which would help a fellow stay right-side-up going through that tumbling water, I was going to need them. So I gathered up everything loose in the boat and put it in the hatches, stripped down to my bathing trunks, hooked a life-belt around my waist, washed my face and hands in the river water, took a gulp of it, and then untied the boat and shoved off.

It took about four minutes to row out into the current above the tongue, a half minute more to glide down the tongue past that submerged rock, and then in less seconds than it takes to write this down on the typewriter I had pulled out of those big breakers and was coasting along in smooth water to a point just above where Norman had moored the *Wen*. Those oars

had done just what I told them to. "You followed my route perfectly," Norman said.

So that is the beginning and end of my career as a Colorado river boatman. I am going to quit now while my record, like Norman's, is 100 per cent. Lady Luck might not be so good to me next time.

We dropped down below 217-Mile for lunch, then in the afternoon ran Granite Springs and 224-Mile rapids without stopping. Granite Springs marks the high point reached by Harry Aleson in his effort to bring an outboard motorboat upstream from Lake Mead several years ago. He had to buck some rough water to get this far, for the lake was not as high then as it is now.

We camped that night on a sandbar at the mouth of Diamond creek where a road was built in to serve the drilling crew which spent several months on this spot scouting the possibilities of a storage dam in the river.

That evening, just as the sun went down, four of us were given our initiation into the Royal Order of Colorado River Rats. This is a ritual passed along to Norman many years ago by Emery Kolb, and is given to those who make their first trip through the gorge from Lee's ferry. Margaret, Kent, Al and I were the eligible members of this expedition. Margaret became the sixth woman to join the Order. Regarding the initiation, I can only say that it was a very wet affair.

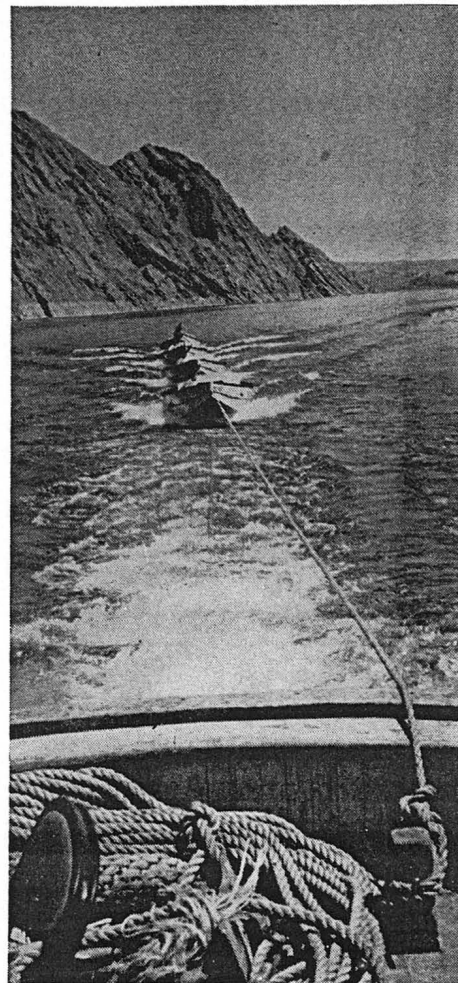
Otis Marston reported that a lion and cub were seen on a ledge below 205-Mile rapids. Also, some wild burros were seen and heard during the day.

That evening on the beach by the light of the moon we played charades, as we had done many evenings on the voyage through the gorge when we were not too tired. We chose sides and limited our acting to the titles of books, plays and songs. Ours was a congenial group and we enjoyed those evenings of play. From Lee's ferry to Boulder City I never heard an unkind word spoken by one member of the party to another.

All the major rapids had been passed, and my companions were relaxed and gay when we shoved off next morning. There were a few minor rapids to run that day—Diamond creek, Travertine, 231-Mile, 232-Mile, 234-Mile, Bridge canyon, Gneiss canyon—and then we came to Separation rapids, once a nightmare to boatmen, but now submerged under the waters of upper Lake Mead.

It was here that Powell's first expedition had a tragic split. Three of the crew, Wm. H. Dunn and O. G. and Seneca Howland, announced they were leaving the party and climbing out. Powell protested, but they climbed to the North Rim, and two days later were killed by Indians.

Historians have not agreed as to who was most to blame for the division in Powell's party, almost at the end of the



End of the journey. The cataract boats were towed from Pierce's ferry to Boulder City by a Park service launch.

journey. Some have accused Powell of being harsh and arbitrary. Others regard the men who left as deserters. Julius F. Stone became an outspoken partisan on the side of Dunn and the Howlands, and in 1939 placed a bronze plaque in memory of the three men on the sidewall above the rapids.

I was interested in Norman's conclusions regarding this episode. "Powell may have been guilty of all the misdeeds charged against him," said Norman, "and yet I cannot justify the men in leaving him at this critical point in the journey. In my opinion they were deserters."

We climbed the sidewall to read the inscription on the plaque, and then had lunch in the shade of trees along Separation creek.

One of the launches operated by private concessionnaires on Lake Mead was scheduled to meet us somewhere near the head of the lake. But the bars and shoals where the Colorado dumps its daily load of silt into the reservoir make treacherous navigation for large craft, and we were sure they would not come as far as Separation creek. That afternoon we rowed with the sluggish current in the upper lake, and when a breeze sprang up hoisted our tarpaulins as sails.

By six o'clock in the evening we estimated we had come 20 miles. We pulled in and camped among the tamarisks and willows on a bar near Quartermaster canyon. We could hear wild burros braying during the night.

Next morning we were up at 5:30, and two hours later the camp chores were finished and we were on the lake again. The crew and passengers took turns with the one set of oars in each boat, working 30-minute shifts. Occasionally there would be a light breeze, and we would take advantage of it to raise the sails. But most of the time we were on our own power. The current had disappeared by the second day and it was slow going, but no one complained.

At 11:30 we pulled in to Emory falls, a picturesque cascade that drops 40 feet over a sheer cliff into a little cove. When Lake Mead is at low stage sandbars and driftwood often make the falls inaccessible by boat, but the lake was high now and we were able to fill our canteens by rowing directly under the falling water.

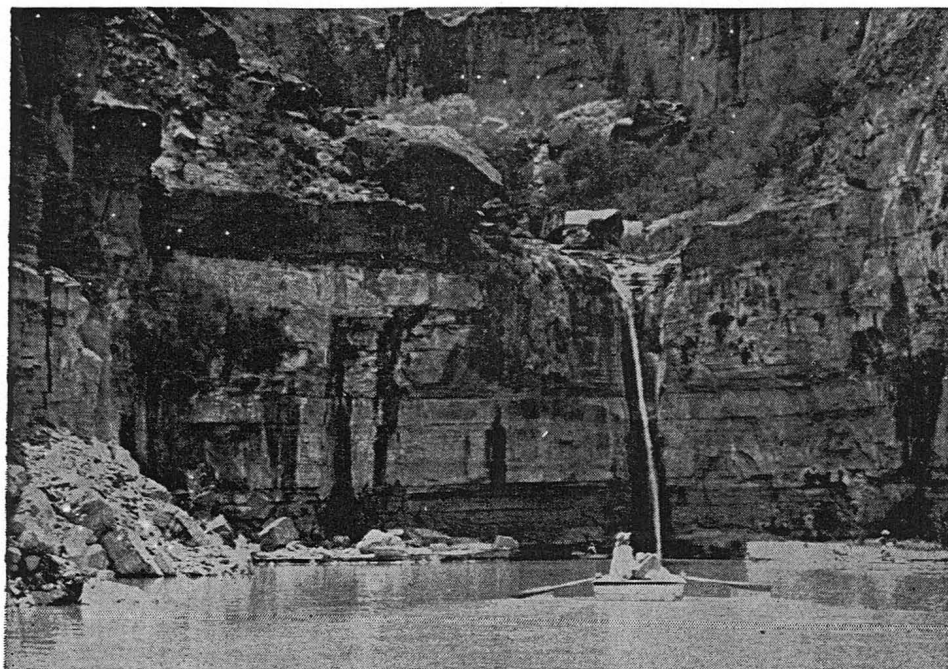
On the gravel bar at Emory falls is a botanical garden of strange bed-fellows. Yellow columbine, crimson monkey-flower, thistle and maidenhair ferns were growing together where a seepage from the sidewall provided moisture for their roots.

We had expected the launch to meet us here, but when it failed to arrive at 4:00 o'clock we shoved off and headed down the lake with our oars and improvised sails. Below Emory falls the canyon walls in which we had been imprisoned for nearly three weeks rolled back and unveiled a great expanse of blue sky. We were out of the Grand Canyon gorge.

Our immediate destination was Pierce's ferry. We were sure the boat would meet us there. As we headed into the great in-



Julius F. Stone erected this plaque at Separation rapids where Dunn and the Howlands left the Powell party.



At Emory falls the boatmen were able to row in and fill the canteens from the falling stream.

let in which the Pierce ferry landing is located we heard the put-put of an outboard motor, and in a few minutes Bill Green of the Pierce ferry ranger station came alongside. We tied onto the little power boat and arrived at the landing in tandem formation just before dusk.

Green lives alone at the old landing, operating a weather station for the Weather bureau, taking water measurements for the Reclamation bureau, seismological readings for the Geological survey, and in the service of the Park department filling the role of custodian and dude-wrangler. Fishermen and campers often follow the rough road to the old ferry for a few days' outing. This is part of the Hoover Dam recreational area and Bill Green is Uncle Sam's official representative in this remote corner of the desert world, and a good host he proved to be.

We camped overnight on the beach and next morning a National Park service launch arrived with a welcoming committee that included President Paul McDermott of the Las Vegas chamber of com-

DESERT QUIZ

Here is Desert Magazine's monthly brain exercise. It is written for those who would like to become better acquainted with the desert playground of the Southwest. It includes a bit of geography, history, geology, botany and the general lore of the desert country. You will not get them all right, but you will be a wiser person when you have tried. Twelve out of 20 is a fair score. From 13 to 15 is superior. Sixteen or over is exceptional. The answers are on page 45.

- 1—Highest peak visible from the California desert is— San Jacinto peak.....
San Geronio peak..... Mt. Whitney..... Telescope peak.....
- 2—Bill Williams river is a tributary of— The Colorado river.....
Salt river..... San Juan..... Gila.....
- 3—Stovepipe Wells hotel is located— In Salt river valley.....
Death Valley..... Near Salt Lake..... In Imperial valley.....
- 4—One of the following is a poisonous lizard— Gila Monster.....
Alligator lizard..... Chuckawalla lizard..... Leopard lizard.....
- 5—First party of white men to visit Rainbow bridge was led by—
Kit Carson..... Marcos de Niza..... Lieut. Beale..... John Wetherill.....
- 6—The name John Hance is associated with— Death Valley.....
Grand Canyon..... Founding of Santa Fe..... Exploration of Great Salt Lake.....
- 7—The feud between the Clanton gang and the Earps came to a showdown fight at— Ehrenberg..... Bisbee..... Prescott..... Tombstone.....
- 8—The staple meat in the diet of the Navajo Indian is—
Beef..... Mutton..... Wild game..... Pork.....
- 9—In driving your car through heavy sand you will probably get best results by— Letting your wife drive while you push..... Putting chains on the wheels..... Reducing the air pressure in the tires..... Turning the car around and backing through.....
- 10—The mountain range northeast of Salton sea in Southern California is the—
Laguna..... Santa Rosa..... Castle Dome..... Chocolate.....
- 11—The notorious Indian chief who used the Dragoon mountains of southern Arizona as a hideout was— Irateba..... Winnemucca..... Palma..... Cochise.....
- 12—The common name of the desert plant of the genus Fouquieria should be spelled— Ocotillo..... Ocotilla..... Ocatilla..... Ocatillo.....
- 13—The man for whom the Bandelier national monument of New Mexico was named was a— Trapper..... Archeologist..... Artist..... Scout.....
- 14—The prehistoric Indian tribesmen known as Hohokam occupied the area now known as— Salt River valley..... Havasupai canyon..... Mojave desert..... White mountains of Arizona.....
- 15—The famous Bottle House is located at— Rhyolite..... Goldfield..... Panamint City..... Calico.....
- 16—The metallic name of the mineral known as Malachite is—
Copper..... Iron..... Silver..... Lead.....
- 17—The infamous Mountain Meadows massacre occurred in—
Nevada..... Arizona..... California..... Utah.....
- 18—The fleetest wild animal now found in Nevada is the— Mule deer..... Antelope..... Jackrabbit..... Bighorn sheep.....
- 19—To reach the famous Phantom Ranch it would be necessary to—
Cross the Paiute reservation in Nevada..... Climb the Enchanted Mesa..... Go to the bottom of Grand Canyon..... Take a trail out of Taos.....
- 20—The territory known as the Gadsden Purchase was bought from—
The Indians..... France..... Spain..... Mexico.....

merce, Dr. Gordon Baldwin, archeologist for the Park service, P. C. Christensen, director of power at Hoover dam, and a group of newspaper and radio reporters and photographers. Uncle Sam's boat, piloted by Ray Poyser, veteran lake pilot, towed our boats on the last lap of the voyage to Boulder City.

That night we toured Hoover dam as guests of the Reclamation bureau, and had a final dinner together as a fitting end to the Nevills' Colorado River Expedition of 1947.

Somewhere up the lake we saw the last of our mascot, the blue heron. For its friendly interest in our journey through those rough waters I can only wish the bird a long and healthy life—and lots of fish dinners.

Navigation of Grand Canyon has passed through a radical transition since 1869. First came the explorers—the Powells, Stanton, Brown, Dellenbaugh and the pathfinders who proved the river was navigable. They won through terrible hardships and many casualties.

Then came that group of men—scientists, engineers and professional men—who pioneered the way to safe navigation. They were the forerunners of the flat-bottomed boats and stern-first operation. Stone and Col. Birdseye and the Kolbs were the leaders in this period.

Then Clyde Eddy in 1927 brought a group of college boys down through the canyon for pure adventure.

And now, Norman Nevills has perfected the boats and the skill needed to make this canyon voyage a glorious adventure in comparative security. The waves are just as big and powerful, and the rocks and eddies no less treacherous than they were 80 years ago. And woe to the boatman who does not know how to face them. But the Colorado river can be run in comparative safety, and for future voyagers who follow this river trail I can only suggest that they never for an instant forget Norman Nevills' guiding rule: "Face your danger, and play it safe!"

THE END

BACK NUMBERS

For the information of new subscribers who missed the first three chapters of Randall Henderson's story of his Grand Canyon voyage, the November, December and January issues of Desert, all or any of them are available at 25c each, postpaid. Address Desert Magazine, El Centro, California.