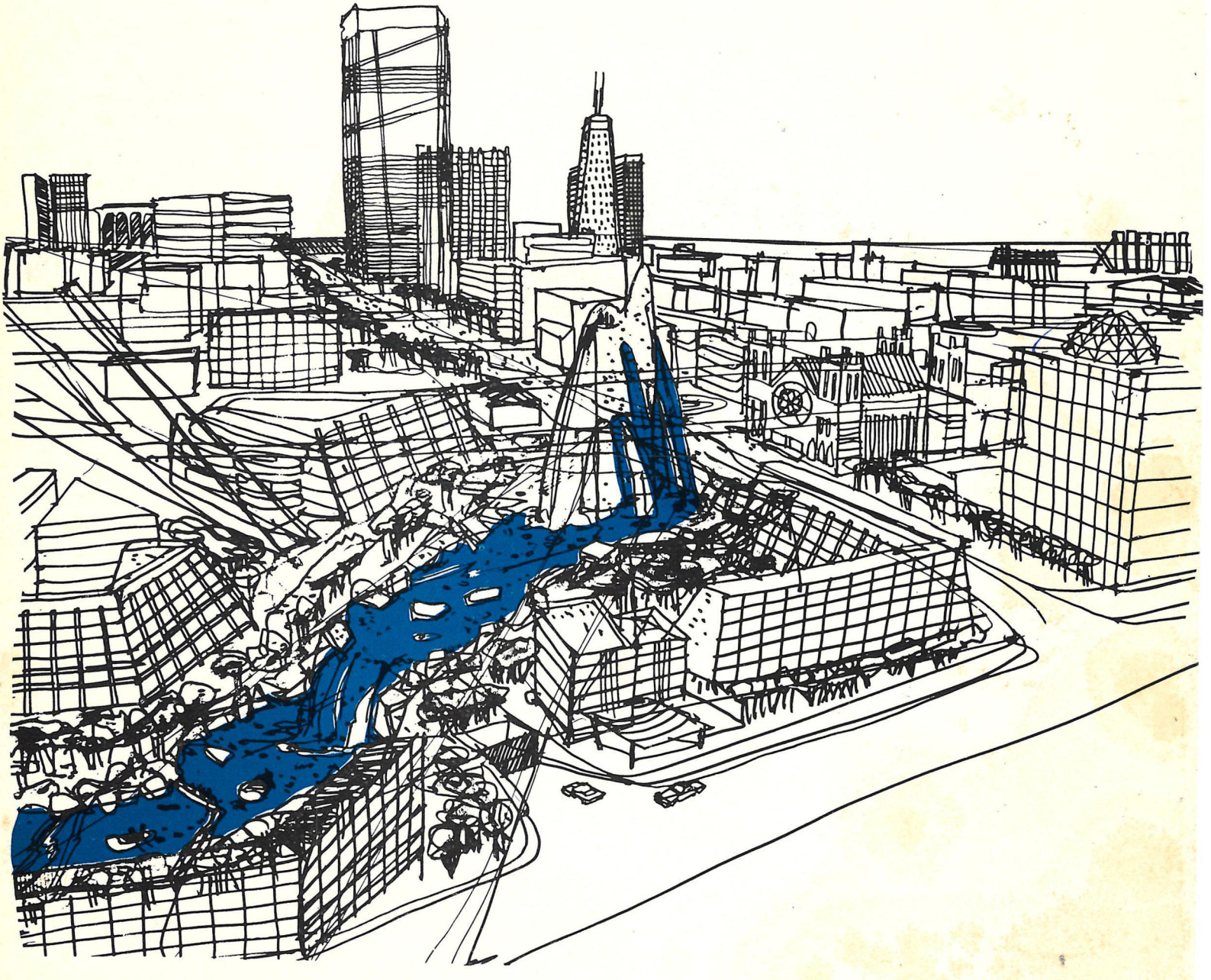
CANOEING IN THE MIDWEST JANUARY 1973

HUT!

MINNESOTA CANOE ASSOCIATION

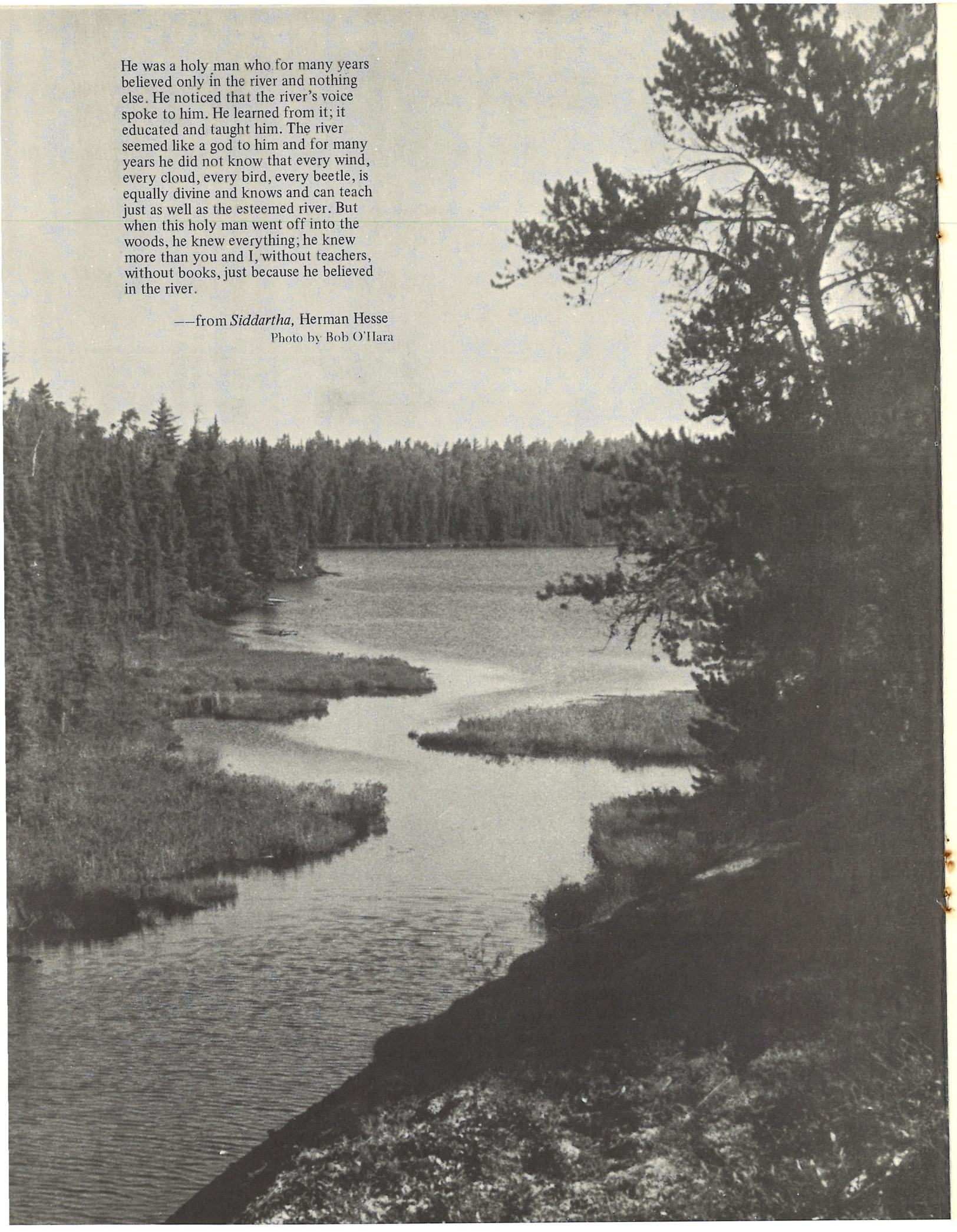


A White Water Course for Minneapolis?

He was a holy man who for many years believed only in the river and nothing else. He noticed that the river's voice spoke to him. He learned from it; it educated and taught him. The river seemed like a god to him and for many years he did not know that every wind, every cloud, every bird, every beetle, is equally divine and knows and can teach just as well as the esteemed river. But when this holy man went off into the woods, he knew everything; he knew more than you and I, without teachers, without books, just because he believed in the river.

—from *Siddartha,* Herman Hesse

Photo by Bob O'Hara



We told you last month to expect something new for the January issue. Actually this month introduces two innovations. One is brand new, the MCA Newsletter. Hut! is still Hut! but in a different shape and maybe with a little difference in character. The Newsletter contains items mostly about the MCA - news of events, minutes of meetings, messages to the membership, and short articles that may be of pressing interest. The Newsletter comes every month.

Hut! will be published every other month. The larger format will allow greater use of illustrative materials and more comprehensive and comprehensible articles and stories.

A few words on policy. The MCA has always taken a strong stand on conservation and Hut! will continue to reflect that by the discussion of conservation issues and the specific action that is often taken by the Conservation Committee. The category of conservation includes issues which are controversial (snowmobiles, for example). In order for readers to take intelligent and well informed positions, we intend to air all sides. Hopefully some intense response will be generated from our readers. We'd be just delighted to publish those responses; furthermore, we think it'd be healthy for the magazine.

Of course, Hut! must be informative about canoeing in all aspects: white water, flat water, racing, cruising, and paddling methods; building information, detailed instructions, and discussion of techniques and new technology. Our instructional articles will be accompanied by drawings and pictures and we'll give you as many different slants and perspectives as we can imagine.

And we'll feature articles about Minnesota — the river communities, wilderness settlements, the geology of the lakes and rivers, and the natural history of the state. We believe that the enjoyment of the wilderness is directly proportional to what one knows about it.

We'll try to get at least one article an issue on one of our rivers — a detailed but personal account including access points, camping areas, rating of the rapids, and the best way to run them.

One thing we would like to find are some good story tellers. We'd like to publish some fiction or some interesting, exciting, and humorous personal accounts. Which brings us to a final word.

We won't hesitate using resources from outside the membership of the MCA, but we'd like the magazine to be primarily of, by, and for the MCA. So we urgently solicit contributions, suggestions, opinions, photos, drawings, cartoons, anything. Get a byline. See your name in print. After all, that's why I took this job.

John Wymore, Editor

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HUT! Magazine is published every other month starting in January by the Minnesota Canoe Association, Inc. a nonprofit organization, and is distributed to more than 1800 members, and numerous friends of the MCA across the nation. Our purpose is to distribute information about canoe sports and canoe camping, to preserve and promote wild rivers, to effect conservation of canoeable waterways, and to encourage canoeing as family recreation.

Pictures (glossies), cartoons, art work, announcements, letters, and articles of all kinds which serve to promote the purposes of the MCA are cordially invited. Contributions should be typewritten, preferably double-spaced, and should be in the hands of the editor by the 5TH DAY OF THE PREVIOUS MONTH, AD COPY BY THE 17TH. We regret that only token compensation can be paid for photographs, and that no compensation can be paid for literary copy, however, byline credit will be extended to all contributions. Contributions cannot be acknowledged and will be returned — usually within eight weeks — ONLY when requested and accompanied by a stamped, self-addressed envelope. Please DO NOT send documents. Address: HUT! 5804 Tracy Avenue, Minneapolis, Minn. 55436.

Statement of Policy: The Minnesota Canoe Association, Inc. cannot assume responsibility for the accuracy of the material presented by authors of the articles in the magazine. The pages of HUT! are offered as a clearing house of information and a forum for exchange of opinions, experiences, and ideas. The individual reader must evaluate this material for himself and use it as he sees fit. Every effort is made to present material of wide interest that will be of help to the majority.

Likewise, we cannot guarantee or endorse any product offered through our advertising. We invite constructive criticism and welcome any report of inferior merchandise obtained through our advertising, so that corrective measures can be taken.

HUT! STAFF
EDITOR
JOHN WYMORE
5804 Tracy Ave.
Minneapolis 55436

ART DIRECTOR
MARY REINHART
1632 Edmund Ave.
St. Paul 55104

BUSINESS MANAGER
MARGIE JOHNS
2936 N. Simpson
St. Paul 55113

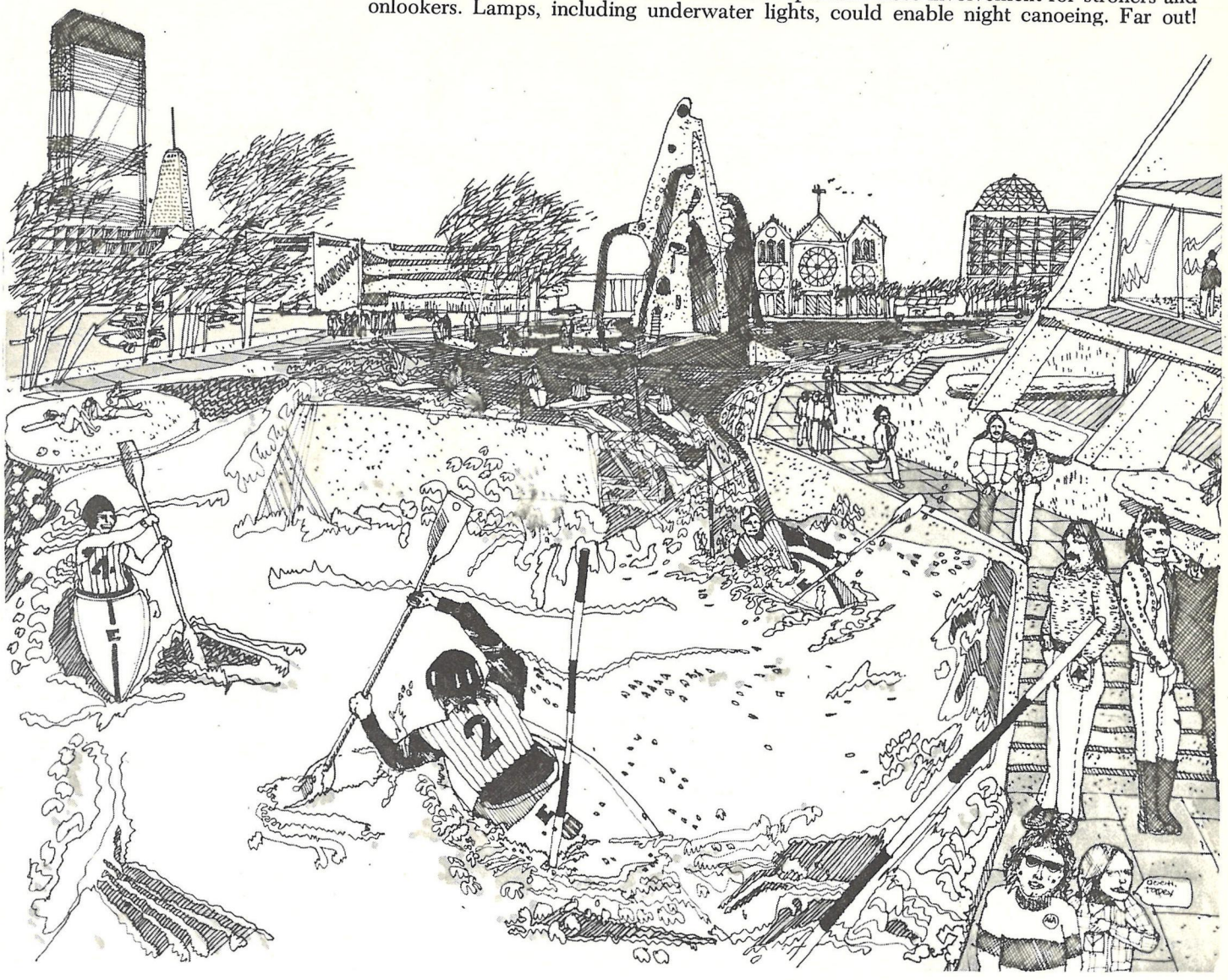
ADVERTISING SALES
BOB SCHUETZLER

NEWSLETTER STAFF
EDITOR
JOHN NOVOTNY

ASSISTANT EDITOR
LOIS MARTIN

TYPIST
JACKIE SCHUETZLER

When looking upstream from about LaSalle. Pedestrian concourse along the banks, and vehicle and foot bridges over the stream provide close involvement for strollers and onlookers. Lamps, including underwater lights, could enable night canoeing. Far out!



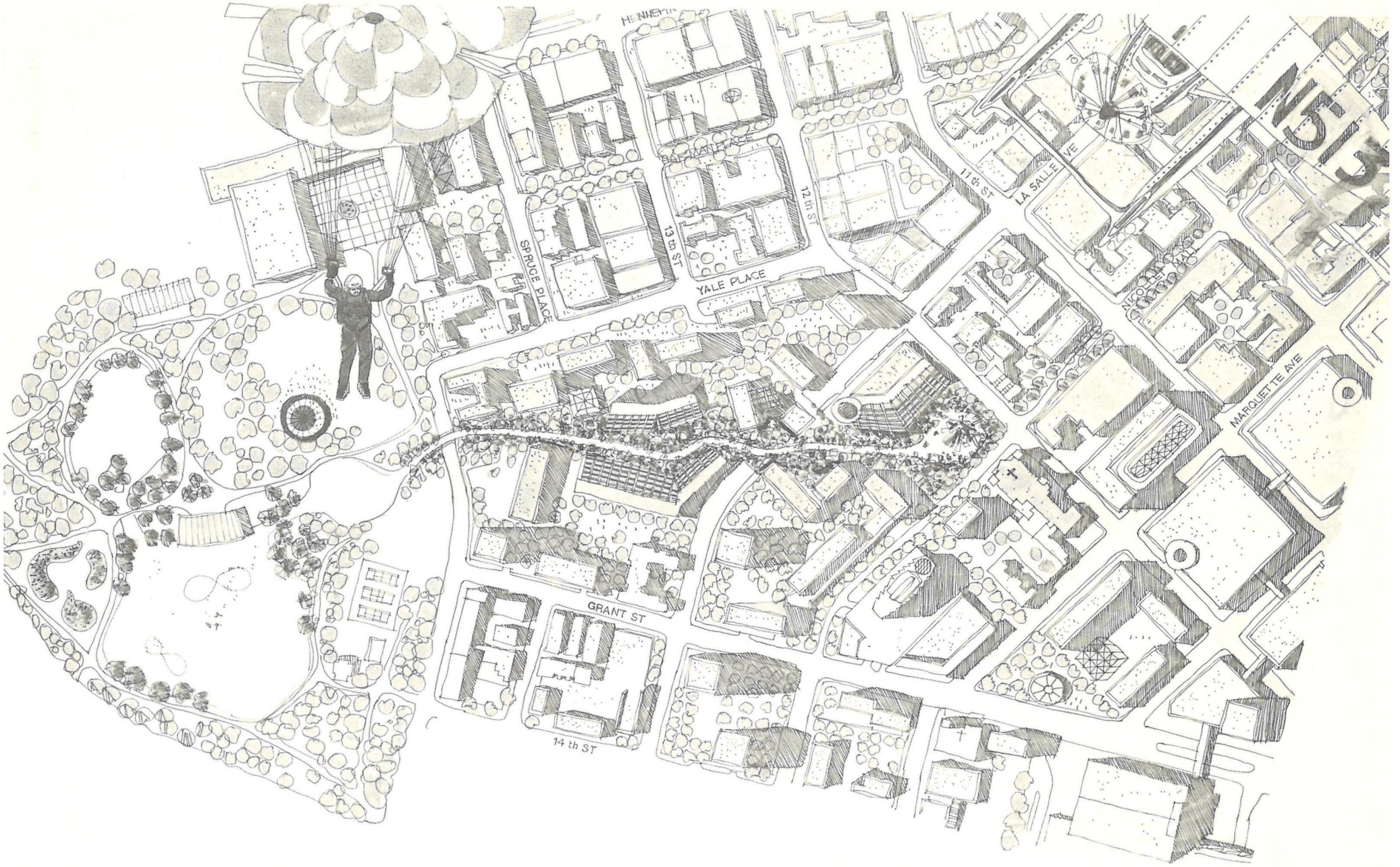
A Canoe Course For Minneapolis

Since seeing the Augsburg Course on TF everybody's talkin' about man made white water courses for the United States. Cincinnati's canoeists are trying to get the Army Corps of Engineers to build a course for that city. Here's an idea for Downtown Minneapolis.

by John Wymore and Bill Warmack

Ben Berger is a retired park commissioner and he gave to the City of Minneapolis a gift. That gift was a fountain. Well not exactly. What he gave was a sum of money to be used to construct a fountain in the downtown area if someone ever got around to it. So far there is no fountain but presumably the money still lies earmarked and waiting. Meanwhile the Planning and Development Department of the City of Minneapolis has an urban renewal plan for the Loring Nicollet Community. Still meanwhile Milo Thompson, Professor of Architecture, at the University of Minnesota, asked some of his senior students what they would do if they were assigned to design a fountain for the City of Minneapolis. One of Milo's students is Bill Warmack and that's where Burger's fountain, the Loring-Nicollet Community City Planning, and Hut! all get together. Bill designed the fountain mountain (or mountain fountain) that you see on the accompanying pages. Naturally what is of special interest to the MCA members is what Bill did with the water after it bubbles out of the top of his mountain and cascades down the precipitous sides. It narrows into a whitewater canoe course ending in the calm lagoon of Loring Park. There you can portage back to the beginning and do it all over – right in the middle of downtown Minneapolis, well almost. And there's all these people along the side of the canal, the overpasses and the restaurants and viewing ledges on the mountain (see you climb the mountain both inside and out – or take an escalator – or maybe if you signed a waiver the city would let you alpine it. (If the city recognizes alpine as a transitive verb.) If it should occur to you to ask; "how do you get the water back up to the top of the mountain?"––Well, don't bother us with technical details.

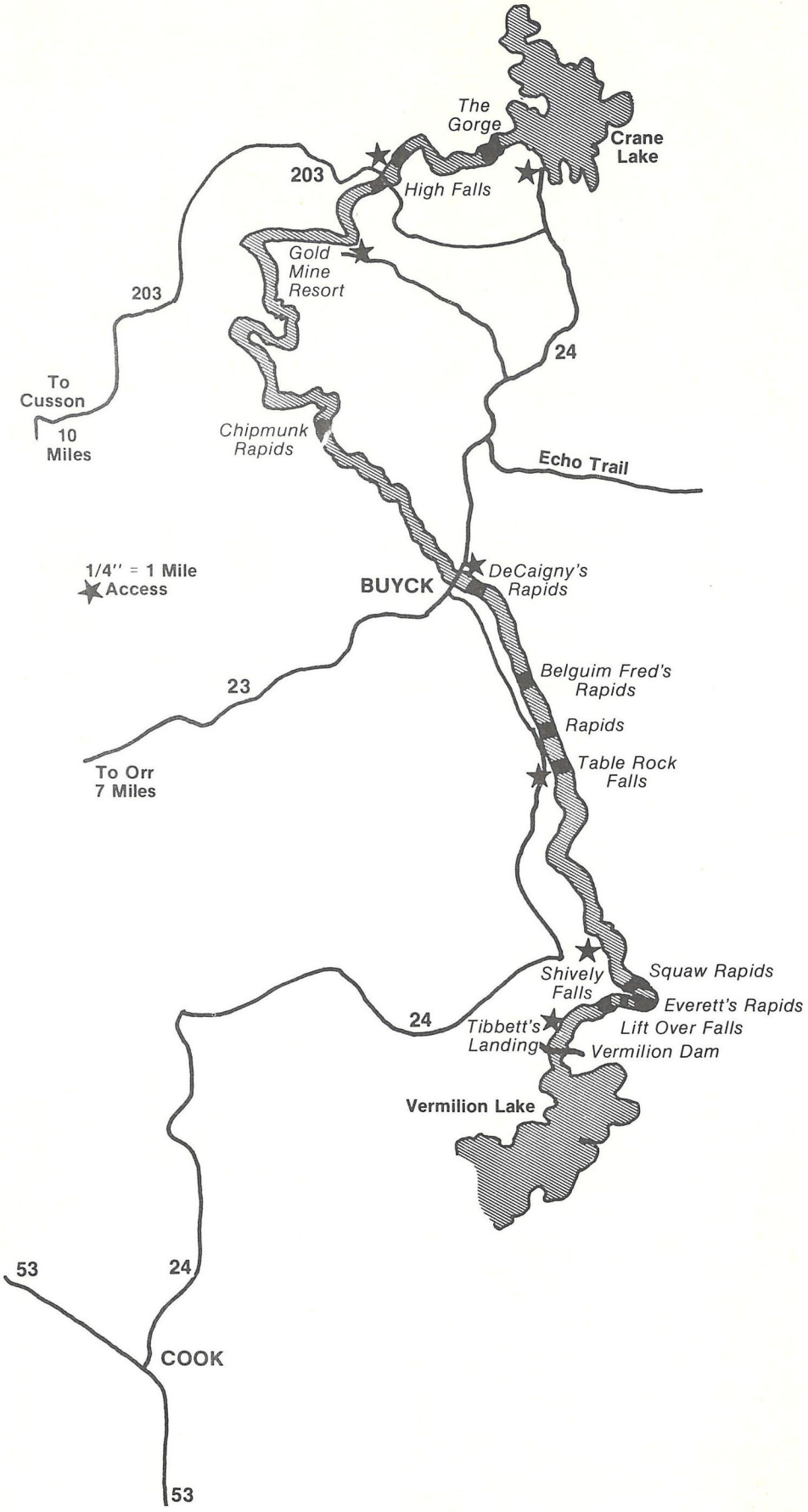
The city has another plan that might pique the ingenuity of canoeists-designers. That's the River Front Project that you might have seen in the papers a few weeks ago. Some of our readers ought to take a stab at designing a canoe course on the Saint Anthony Falls gradient. We'll publish the most interesting offerings.



Mountain and waterfall rise from inside fountain plaza at 12th and Nicollet. A stream complete with ledges, rock gardens, haystacks, upstream V's, downstream V's, and rollers wends its way from the plaza to Loring Park. The parachutist is optional at no extra cost.

Canoeing The Vermilion River

by Sid Rommel



Sid Rommel has not only been active in the MCA for a long time but also, and probably for a longer time, been in and around the Minnesota rivers. We plan to run this kind of article regularly and at the end of the year maybe publish a collection.

Vermilion River in northern St. Louis County is the outlet of Lake Vermilion. It drops 239 feet in the 41½ mile course to its mouth in Crane Lake. The river is noteworthy for its variety; spectacular falls, easily run to impossible rapids, rock gorges to lake-like expanses, rice beds and low hardwood flood plains to high pine covered bluffs. All this is within easy reach because of numerous access points.

Canoeing the Vermilion River used to be considered a tough trip, but now a permanent camp may be established, or the family may stay at a nearby resort permitting canoeists to travel light with only a day pack and to still have a taste of wilderness. What used to be drudgery with heavy camp equipment, now becomes joy. Two hard days to four easy days should be allowed for the whole trip or a shorter trip may be tailored to the time available.

Vermilion River, just below Vermilion Dam (a concrete apron), has a drainage area of 483 square miles and a mean flow of 312 c.f.s. Because of the reservoir capacity of Lake Vermilion, the flow is more constant than some of the other nearby rivers, e.g., the Littlefork. There is always enough water for satisfactory canoeing though the level of the water will influence the degree of hazard in approaching the portages around rapids and falls. In high water, one must be especially careful to approach close to the bank on the side on which the portage is located, with the stern of the canoe held close to the bank so the current cannot grab it. In high water, some of the portages take off perilously close to extremely swift water.

Many of the rapids can be run. But if that is your intention, all of them should be scouted from the banks first so that you may determine if your skill is equal to the challenge.

If you start somewhere on Lake Vermilion, you should portage Vermilion Dam Rapids on the right. While fishermen in the lake have been inadvertently swept over and have survived, others have drowned here. Or you may start from Lloyd Tibbett's private or fee access (just south of county highway #24 and just north of where the road turns off to Vermilion Lodge and Tibbett's Resort, which takes you to the west bank of the river just below the Vermilion Dam Rapids.)

About one and one quarter miles down is Shively Falls with an 80 rod portage on the left bank. Here too, canoeists have been swept over and have lived but others have drowned. Everyone but the most expert should portage. Both of these have been run in high water with large inflated rafts.

The third portage is at Lift-over Falls which I have run a number of times by staying close to the right bank. The portage is on the right side also.

The fourth portage is at Everett's Rapids. The portage trail is on the right as is also the main channel. It is not a dangerous rapids.

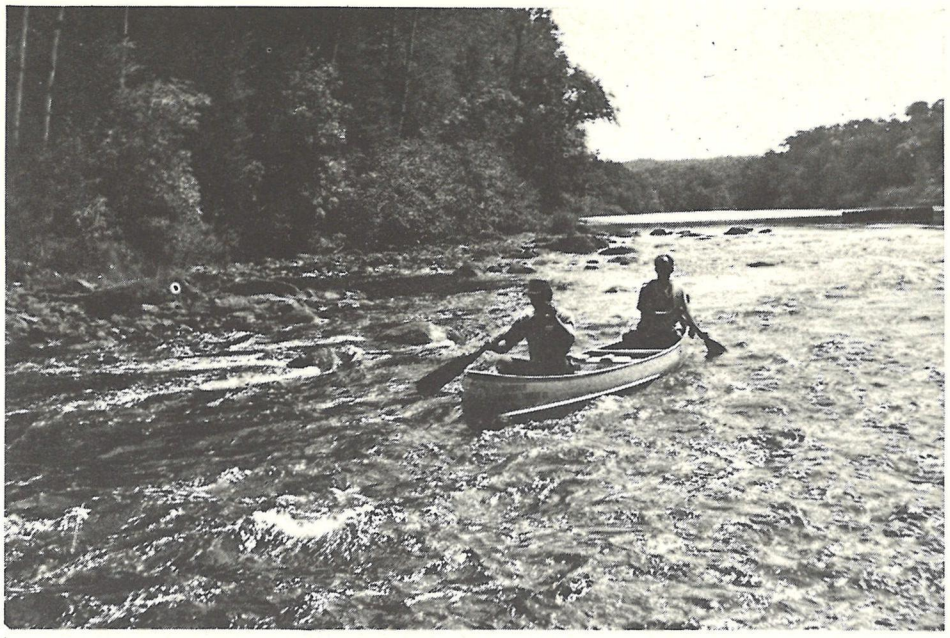
The fifth rapids, "Squaw Rapids", is run by everyone. I do not believe there is a portage trail here. Be careful anyway. Mrs. Tom Ottertail drowned here in 1896.

The river then flows through the "Chain of Lakes", a series of lake-like expansions, quite shallow and weedy. There is a good campsite on the right shortly after entering the slack water. There is also a good campsite on the left bank opposite the mouth of Hilda Creek (named for Hilda Brandvold who homesteaded six miles up this creek in 1910.)

The "Chain of Lakes" comes to an end at Table Rock Falls. The one mile long portage starts well above the falls on the right bank. If you have motorized support and a cooperative wife, girlfriend, or dad, you may paddle up Eight Mile Creek to Highway No. 24, car portage your canoe one and three fourths miles north to the old CCC camp access where you can put back into the river. But first you should walk about a quarter mile down the portage trail to see the falls. I have portaged the falls and then have run the balance of the rapids which I classify as Class III, or difficult. Once you start, there are no pools to stop in to catch your breath or bail out the canoe though the last third is not as steep and is more of a rock garden. The west bank is a cliff for part of the way.

The river is typically river again in a deep valley with pine clad banks. Belgium Fred's Rapids are next. They are easy. DeCaigny's Rapids are just above Buyck. They are also easy. But the bartender at the tavern at Buyck will tell how two young men upset there and chased down the bank after their equipment and never did find one packsack. The tavern is a good place to rest and visit with the owners who are descendents of the original owners. The DeCaigny Half Way House has been a landmark for more than eighty years.

Below Buyck, the river flows through pleasant, pastoral country. This was good farm land before modern mechanized agriculture outdated these small farms. The last farm is four miles below Buyck. The river then flows through totally wild country without an access for fifteen miles. The Pelican River enters five miles



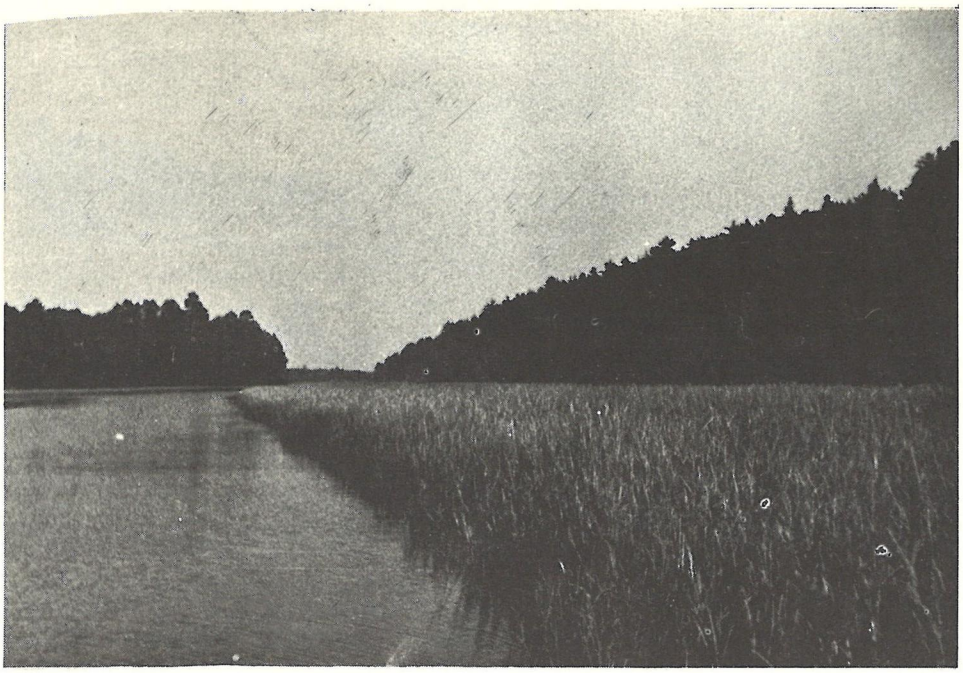
Chipmunk Rapids



Lift-Over Falls



The gorge from downstream



The Rice Beds

below Buyck. A short way up is a big pool below rapids, a good place to fish. Pelican River offers a worthwhile trip, too, through lovely, isolated country. If only there was time enough!

Chipmunk Rapids, two miles below the Pelican, can be run without difficulty. It requires crossing from left to right about halfway down.

One mile below Chipmunk Rapids, the Vermilion spur of the Virginia Rainy Lakes Logging Company crossed the river in 1920. The bridge ruins are still in place. One and one half miles downstream, the pilings in the river date from the logging days. Pine logs from upstream were driven this far, trapped by boom logs, and hoisted to railroad cars for transport to the company's sawmill at Virginia, Minnesota. This was the largest pine sawmill in the Lake States. It drew its logs from this general area from 1910 to 1929.

About one mile from the pilings is Snowshoe Narrows where pine covered bedrock on both banks constrict the river. The right bank is a good campsite. Three and one half miles below Snowshoe Narrows is another good campsite at the base of a high, pine covered hill. This marks the beginning of the "rice beds" which extend for the next eight miles. It is a beautiful sight in late August, after the grain has turned gold against the dark green big pines that line much of the shores. There are several eagle nests in these pines. The Gold Mine Resort is located in the rice bed area. It is the only resort on the river. A gold mine operated here for many years. It is said, however, that the stockholders provided more gold than the ore that was mined.

Two and one half miles past the resort, at the end of the rice beds, is a rocky island with a campsite at the upper end. This is warning to crowd to the left bank and be on the lookout for the portage around High Falls. The river is only a jump across at High Falls but please don't try to find out.

U.S.F.S. Road #203 crosses the river one fourth mile below the Falls. The Superior National Forest provides a picnic area and parking for access to the river. Camping is not permitted.

Just below the bridge, the river narrows to the "Chute". Upstream from the white water at high stages, the current is incredibly fast and extreme care must be taken in approaching the portage (on the left bank). There is a tricky rock about two-thirds through the Chute and so far I have not dared to attempt it, though I have heard it has been run.

Two and three fourths miles below the Chute on the left bank is the last portage, three fourths miles to Crane Lake around the "Gorge". It's a tough climb up and steeper down.

The rapids look like they could be run without undue difficulty; however, the vertical walls of the Gorge pose a rescue problem in case of an upset. So far, I have always portaged because I have been in a small group and didn't have proper safety equipment (helmet and wet suit). If you portage, it is worthwile to paddle back to the river where there is a semblance of a trail on the east bank, climb the rocks, and peek over the rock rim at the river sixty feet below. It is no place for small children.

To the left from the portage is the site of one of the oldest fur trading posts which dates from 1736.

The canoeist has now completed the trip to Crane Lake and may pull out at any of a number of private and public landings or continue the trip east into the B.W.C.A. or Quetico Area or west into Voyageur's National Park. In traversing the Vermilion River, he has had a glimpse of all the beautiful and varied aspects of the Laurentian Shield Country with some personal insight of the impact of its products on the history of the people and living creatures of the area.

High Falls



SUMMARY OF RAPIDS, FALLS, AND PORTAGES

Name	River Miles From Vermilion Dam	Bank on Which Portage is Located	Length of Portage is (Rods)	Vertical Drop of River (Feet)	Notes
Vermilion Dam	0	Right	50	20	Very dangerous, white water experts only with strong support decked and aproned white water canoe or kayak with helmets and wet suits.
Shively Falls	1.3	Left	80	18	
Lift-over Falls	2.4	Right	8	4	Can be run close to right bank
Everett Rapids	2.8	Right	60	5	Can be run close to right bank
Squaw Rapids	2.9	None	-	2	No portage, must be run, channel is obvious.
Table Rock Falls and Rapids	10.3	Right	330	84	The falls are impossible but they are at the upper end. An 80 rod portage around the falls may be made and the balance may be run. Difficult, all an open canoe can handle, a drop of 50' in ¾ mile.
Belgium Fred's Rapids	12.6	Left	40	3	Easily run, channel obvious
DeCaigny's Rapids	15.2	Right	50	4	Easily run, channel obvious
Chipmunk Rapids	22.2	Either	60	7	Can be run, cross from left to right halfway.
High Falls	37.1	Left	40	27	Impossible, must portage
The Chute	37.6	Left	40	10	Very dangerous, white water experts only with strong support and adequate equipment
The Gorge	40.4	Left	240	30	Dangerous and difficult, most should portage. All an open canoe can handle. Rescue difficult because of vertical rock walls.

ACCESS POINTS

Name of Access	River Miles From Vermilion Dam	Notes
Tibbett's Landing	0.2	Private, fee parking
Two Mile Creek	4.4	Public, from roadside down
	+ 1.5	Two Mile Creek
Eight Mile Creek	10.0	Public, from roadside down
	+ 0.5	Eight Mile Creek
		Use this access to car portage around Table Rock Falls
Return to river at:		
Old C.C.C. Camp	11.3	Public
Buyck	15.5	Public, from Co. Hwy. #24, fee parking
Gold Mine Resort	34.2	Private, fee parking
Creek to Rice Beds	35.3	Public, hard to find from river
	+ 0.5	down creek to river
U.S.F.S. Road #203	37.5	Public, picnic grounds adjacent
Crane Lake	42.0+	Public and many private

AWA Establishes Manmade Slalom Course Committee

Jim Sindelar, Executive Director of the American Whitewater Affiliation, has announced the appointment of A. R. McLain, 25 Elm Avenue, Cincinnati, Ohio, 45215, to the position of Chairman of the Manmade Slalom Course Committee.

The American Whitewater Affiliation is a national organization of canoeists and kayakists who enjoy the sport of whitewater paddling. AWA publishes a quarterly magazine. *American Whitewater Journal*, containing information on rivertrips, river conservation, safety, equipment and techniques of whitewater paddling.

The Manmade Slalom Course Committee will be responsible for evaluating potential slalom sites relative to environmental impact and overall desirability and will work with local groups wishing to promote construction of such facilities. McLain, an avid whitewater boater, chairman of the Miami Group of the Sierra Club and member of AWA for several years is presently working closely with the Army Corps of Engineers in the planning of a slalom facility near Cincinnati. The facility would be patterned after the Olympic whitewater slalom course located in Augsburg, West Germany.

A Caution On MCA Resin

by Joe Conrad

MCA resin is a chemical which may be injurious to your health. But don't panic. Read all of this article by Joe Conrad, a chemist and a MCA director. Some of the information appeared in a technical journal that was called to our attention by Al Buccholz, our Conservation Chairman and . . . a chemist.

Naturally enough, if you load up your body with any chemical that is not a natural food, you may be "poisoned". The extent of harmful effect will depend on two things: (1) The general toxicity of the chemical, and (2) the particular physiological make-up of the human individual. We all know that arsenic is a deadly poison - to anyone. On the other hand, penicillin is not harmful except for a few individuals whose physiology can't tolerate it - to *them* pencillin is a "poison".

MCA resin - is it a poison? Not in the commonly accepted sense. But no one would be stupid enough to drink any. However, everyone gets some of the chemical in their systems when working on a canoe. You get it on your hands; you inhale some fumes. Those fumes that you smell are, in part, due to the chemical styrene.

According to a recent article, styrene inhalation or skin contact can cause spots before your eyes, headaches, nervousness, and feelings of weakness.

If you feel like you're getting overexposed, then get some fresh air. If that doesn't help - don't return to work. Quit, get more fresh air and try it again later. Keep the resin off your skin, if possible (rubber gloves are helpful). Clothing with spilled resin should be washed before it is again worn. (Resin which has been catalyzed will harden up and is *not* harmful. In case of eye contact, wash for 15 minutes with running water and get to a physician as soon as possible. If you have chronic pulmonary problems, be especially careful.

How can you minimize contact with this chemical?

Work in a well ventilated area! Use a window fan, floor fan or other *forced* draft.

Occasionally (every ½ hour or so) go outside and get fresh air. When you return you'll get an idea of what you've been breathing.

If you have a tendency to allergies, buy a chemical filter nose mask.

Keep your hands clean! Wash them repeatedly in hot detergent water with added household ammonia (good also for cleaning brushes).

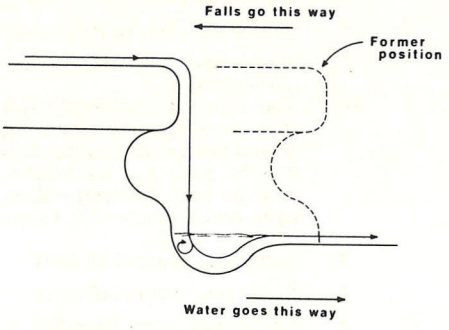
Keep your cloths clean! If you spill the resin on clothing where it touches your skin, change the clothing.

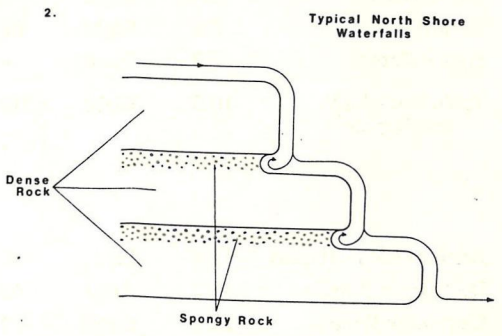
Use common sense as to storage of the resin, etc.

The Story of Our Minnesota Earth

J. MERLE HARRIS

J. Merle Harris is a Professor of Natural Science at the University of Minnesota. His article is reprinted with permission from Volunteer, the magazine of the Department of Natural Resources.





Minnesota's geologic heritage is rich and varied and fortunately much of it has been captured within our State Parks. One array of parks on Lake Superior's North Shore displays a striking, rocky-shore scenery not unlike that of New England's coast. In the diagonally opposite corner at *Blue Mounds* one catches a glimpse of the drier, cactus-dotted Great Plains to the west.

The southeastern corner of our state has been likened to a "Little Switzerland". *Beaver Creek Valley* and *Whitewater State Parks* are there and hold deep valleys, steep cliffs, craggy heights. In the Red River Valley country we have a vast, almost featureless, plain. But there is a story here too, less striking perhaps, but just as long and just as interesting. Minnesota, situated as it is near the heart of the continent, has a "mix" that is equaled in few other states.

Our state has some of the most ancient rocks on this continent, and indeed in the world. In *Tower Soudan Park* we can look at them. And, by contrast, only yesterday we had a gigantic face-lifting job done by glaciers. Our handsome profile is due largely to their massive abrasive action, and to the deposits these glaciers left behind. They rubbed down the sharp, angular features and pushed them into low places, erased old drainage lines and forged new ones. When they melted they left an irregular blanket of broken rock and soil, called glacial till. The low spots – holes or thin spots in the blanket – became our thousands of lakes. *Glacial Lakes Park* shows us some of these.

Thus, our landscape is a newly developing one, geologically speaking. The streams have not yet had time to drain many of the lakes – it has only been 10,000 years or so since their work-day began! Neither have they had time to wear down the waterfalls along them – although many have eroded their way upstream a considerable distance from where they started.

So it is that the two outstanding charms of Minnesota's scenic beauty, her lakes and her waterfalls, are due to the finished work of the glaciers and to the unfinished work of the streams. It is our good fortune to be living in Minnesota in this geologically "in-between" stage.

It takes more than water to make a waterfall. There must be something for the water to fall over – a nearly vertical drop-off in the stream's channel. And, if a drop-off is to be maintained as the waterfall gradually works its way up-stream *(and they all do)*, the supporting rocks must consist of an upper layer that is more resistant than those at the bottom. In this way, even though the plunging water undercuts and removes the layers at the bottom, a lip remains to support the top.

This required condition is repeated time after time in the State Parks along the North Shore of Lake Superior. As many already know, most of this 150-mile long, rocky shore consists of lava flow on lava flow – *hundreds of them!* The upper part of each flow usually consists of at least a few feet of spongy rock, due to gas pockets in the bubbling lava just before it became solid.

Of the dozen or so State Parks along the North Shore, nearly every one has a river with one, or several, waterfalls along their courses as they plunge from higher levels over the lava-flow rocks on their way to the lake. Typically, we find a stairstep series of falls, each one being as high as that particular lava flow is thick.

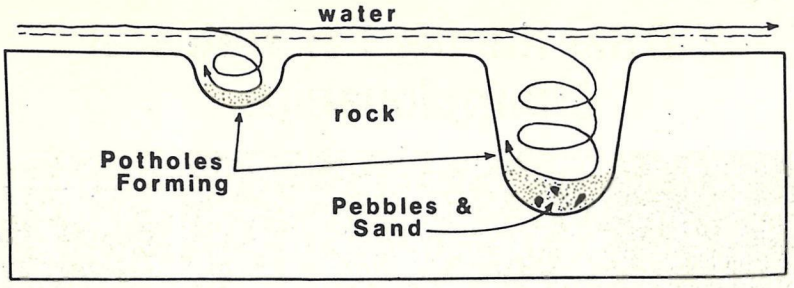
The story would be far too long if we tried to do justice to the many North Shore waterfalls. Rather, let us choose one, known to many as Pothole Falls and to others as Devil's Kettle Falls. It is perhaps less well known than some others so some people may wonder why we should choose it. There are two reasons for our choice. One is that it presents a problem, a challenge as yet unmet, to the writer's knowledge. The other is that, situated as it is, the farthest up the shore, in going to it we will be led to stop at others on the way – an additional reward.

Pothole Falls is located on the Brule River in *Judge C. R. Magney State Park*, about 18 miles northeast of Grand Marais. To see it one must hike up the rock-walled Brule for about a mile and a half, seeing two or three other falls on the way. Upon arriving at Pothole Falls, the hiker sees an unusual sight. At the lip of the falls, the water is divided by a low rocky ridge. The east portion forms a very pretty, 70-foot high falls. But, surprisingly, the west portion disappears into a rock chasm, a pothole, about 10-feet in diameter, just as it pours over the edge. As a separate stream, it's water is not seen again. The puzzle: where does this water rejoin the other half of the stream? It is probable that it occurs beneath the plunge-pool at the base of the other falls. But this is only conjecture.

Potholes are interesting features in themselves. They are typically very round, very smooth, vertical holes drilled in solid rock. They are often found in the vicinity of waterfalls but many are found elsewhere in rocky streambeds. One often finds fairly large, rounded boulders inside the potholes. They are often called "grinders", with the thought that they are the cutting tools used by the swirling water to drill the potholes. They are undoubtedly partially responsible, but the work of thousands of sand grains, also found in the potholes, are doubtless far more effective.

Potholes come in many sizes, from a foot or so in diameter up to 20 feet or more and are even more variable in depth. Presumably they always start as small swirls in rocky stream beds and continue to enlarge as long as water continues to swirl within them. The one we have described above may be as deep as any in the State, but at *Interstate Park* on the St. Croix River there are many that are larger in diameter. They are also found in *Temperance River State Park* and at *Banning State Park* on the Kettle River.

Before leaving the story of the potholes and waterfalls, we must be sure to mention Minneopa Falls in *Minneopa State Park* near Mankato. It is a very pretty falls, about 30 feet high due to a resistant layer of sandstone above a less resistant



one, along the course of Minneopa Creek, a tributary of the Minnesota River.

Except for the very southeastern corner, all of Minnesota was covered by gigantic glaciers during the most recent of the earth's ice ages. Glaciers destroyed many features that we would have thought scenic. However, as they melted they left a legacy which is probably far greater than that which they destroyed. Nearly all of our 12,000 lakes are attributable to the glaciers. Most of them owe their existence to one of two processes. Either the load of rocks and soil was dropped in such an uneven pattern that basins were formed, or large blocks of ice buried, or partly buried, left basins when they finally melted.

Not infrequently blocks of ice are believed to have become localized in preglacial valleys, later producing chains of lakes. In the case of Lake Itasca, at *Itasca State Park,* apparently several ice blocks were buried so close together that a single, V-shaped lake basin resulted. Each lobate portion of the lake probably represents a single ice block. Lake Bemidji is another example of an ice-block lake. You may visit *Lake Bemidji State Park* in this area. Unless fairly clear evidence of an ice-block basin or some other specific cause is found the normal assumption would be that irregular deposit of glacal till is responsible for the lake. A very good example of a lake of this type is Lake Andrew in *Sibley State Park.*

A few of our larger lakes are due to still another glacial effect. At the edge of of a glacial lobe there is normally a ridge of glacial till called a terminal moraine. After the glacier melts, the ground may slope toward the terminal moraine, and if it does, a lake basin is formed. Mille Lacs Lake, on the shores of which both *Mille Lacs Kathio* and *Father Hennepin State Parks* are located, is a lake of this type. So also is Lake Shetek, of *Lake Shetek State Park* in southwestern Minnesota. Its odd shape is due to a "dogleg" in the terminal moraine.

Glaciers are thickest nearest their sources – which in this case was in Canada. A good example of a glacially scooped lake is Saganaga Lake on the Canadian border. However, the grandest example of all is, of course, Lake Superior. There is good evidence in the rock structures around the lake that there was a trough in this region long before the glaciers arrived. It was presumably this trough that guided the glaciers that scooped out the basin to the depth and shape that we see today. This was a tremendous excavating job! We find excellent evidence of the scooping and scraping action in the grooves and scratches on the smooth rock surfaces around the rim of Superior.

At countless places along the North Shore, from Duluth to Grand Portage, one can find this type of evidence. One of the best places to see it is in the harbor in Grand Marais, but it can also be found in *Gooseberry Falls* and *Jay Cooke Parks.*

Terminal moraines, mentioned above, come in many sizes. Some of the larger ones are 10 or more miles wide and several hundred feet high. Mount Tom, a high point on the moraine in *Sibley State Park,* commands a view for some 50 miles around. Another point is Inspiration Peak near Parker's Prairie which offers a striking view over many lakes in three counties.

Another interesting type of ridge, formed by glaciers, are eskers. They are usually long winding ridges composed of sand and gravel. They were formed by streams flowing in tunnels under the ice, after the ice had ceased to move. There are many eskers in the State and some are in State Parks. In *Scenic State Park* near Bigfork, Coon and Sandwich Lakes are separated by an esker, known locally as "Chase Point." And in Itasca State Park there are at least two. One is called Brower's Ridge and is located between Elk Lake and Nicollet Creek along the Lind Saddle Trail. The other is Schoolcraft Hill and is located just east of Douglas Lodge.

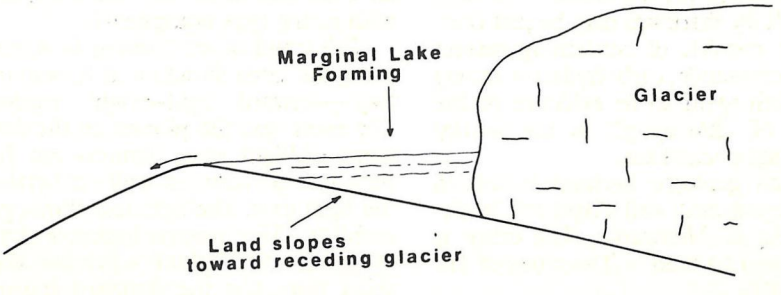
One of the effects of the departing glaciers was the formation of lakes along the margin of the ice as it was receding. This could occur almost anywhere along the glacier's margin where the ground sloped toward the ice front. This doubtless happened hundreds of times over the State but most of the time the lakes that were formed were small and of short duration. But some were very large – the largest of all being *Glacial Lake Agassiz.* It occupied the Red River Valley both in North Dakota and in Minnesota. It was somewhat the shape of a funnel, with the Red River Valley portion representing only the stem. The flaring part lay in Canada. It began as a small lake, near present Lake Traverse near Brown's Valley, with the glacial front a short way to the north. However, as the ice front receded the water front followed – the ice front was, and continued to be, the north shore of the lake. It continued to increase in size as long as there was enough ice in Canada to block what is now the Nelson River.

For several thousand years, Lake Agassiz was forced to overflow southward into what is now the Minnesota River. This enormous amount of water was responsible for the erosion of the large valley of the Minnesota River. A number of State Parks are located in the Minnesota River Valley. But only *Lac Qui Parle State Park* is on the river itself. The enormous size of the valley is well displayed because the Lac Qui Parle River has built a delta in and across the valley, thus creating Lac Qui Parle Lake. An artificial dam has been built on top of the natural one in order to raise the level of the lake. But this only serves to dramatize the breadth of the valley.

Lake Agassiz lasted so long that it produced some well-defined beach ridges. The highest of these is called the "Herman Beach," named for the town through which it passes. It runs essentially north-south to near Crookston, where it turns east. It separates the flat farmland of the Red River Valley from the higher lake country to the east. No State Parks lie on Herman Beach, although one or two are nearby.

One of the lower beach lines is the Campbell Beach which passes through Campbell, near Fergus Falls. A still lower one is the McCauleyville Beach. *Buffalo River State Park,* east of Moorhead, is located on the Campbell Beach, which is just 1000 feet above sea level. Appropriately, a bronze plaque on a large glacial boulder near the entrance denotes this fact. On the McCauleyville Beach there are two State Parks, *Old Mill,* northeast of Warren, and *Lake Bronson,* still farther north.

The remarkable flatness of the Red River Valley is due in part to the thick lake deposits spread over the rough deposits left by the glaciers. In addition, the



swash of the waves along the shore of Lake Agassiz "smoothed out" these fine sediments as the lake slowly withdrew. Thus was produced one of the flattest and richest farming areas to be found anywhere in the world.

The effects of the glaciers extended well beyond the actual area covered by them. It was mentioned above that the overflow from Lake Agassiz furnished the water for the enormous erosion of the Minnesota River Valley. But this water was only part of that collected by the Mississippi River for its erosive work that reached most of the way to the Gulf of Mexico. Southeastern Minnesota was the only part of the state not covered by glaciers. But even here their effects were felt. Meltwater from glaciers greatly increased the erosive power of all the streams in that area, as illustrated by the canyons in *Whitewater* and *Beaver Creek Valley State Parks.*

Many Minnesotans believe the oldest rock in the North Star State is the Ely Greenstone – for this had been believed to be true for a long time. Only recently, since the great age of the Morton gneiss was established by radiometric methods, has the Ely greenstone been reduced to second place in the contest for antiquity. Although it is now a greenish metamorphic rock, the Ely Rock apparently started its existence as basaltic lava flows. Interbedded with it many places is the Soudan iron formation. It consists of a banded mixture of reddish jasper and gray to black hematite. It is often called "jaspilite".

This iron ore is not only the oldest in the state, but it was the first to be mined. It was mined at Tower-Soudan and Ely from 1884 until about 1962, when the last mine was closed. Soon after, the Oliver Mining Company deeded it to the State of Minnesota for use as a State Park.

Tower-Soudan State Park has been referred to as our "tallest" State Park. And indeed it is – about half-a-mile, in fact, if one looks up from the bottom of the shaft. Thousands of visitors now go down in this mine each year (it is open year around) to see the ancient rock, the heavy equipment that was used, and to hear the story of the mining operation from men who know – men who were the working force here until a few years ago.

One fascinating aspect of this ancient rock is the fact that it contains almost certain evidence of life – perhaps 3 billion years old. The evidence does not consist of definitely proven fossils – though some shadowy markings may be just that. Rather, it consists of containing certain organic compounds, carbohydrates among them, which seem to be evidence of the existence of chlorophyll in the murky water of that ancient sea.

Our rich geologic heritage is indeed well preserved and well displayed in the State Parks of Minnesota. The story is there for you to read – The story of our ancient earth.

X-C Ski Racing For National Championships



Athletic Competition? It has to be something in the nature of man. I won't attempt to analyze this situation, but wherever two or more people engage in a sport, be it canoeing or skiing, the challenge comes out––"Let's race". So––for anyone that likes to see a good race, the opportunity is close at hand. The dates are set at Jan. 28 through Feb. 4, 1973. The place is Hyland Lake Park Reserve in Bloomington. The event is the USSA Nordic National Championships. This means seeing X-C skiing done to perfection.

The last time a Nationals race was held here was in 1938, and by chance, at approximately the same site. This race pits the country's best in cross-country skiing against each other. Both men and women. There aren't many details available on the earlier event, but basically it was a man's competition, with only one track length and various race classes.

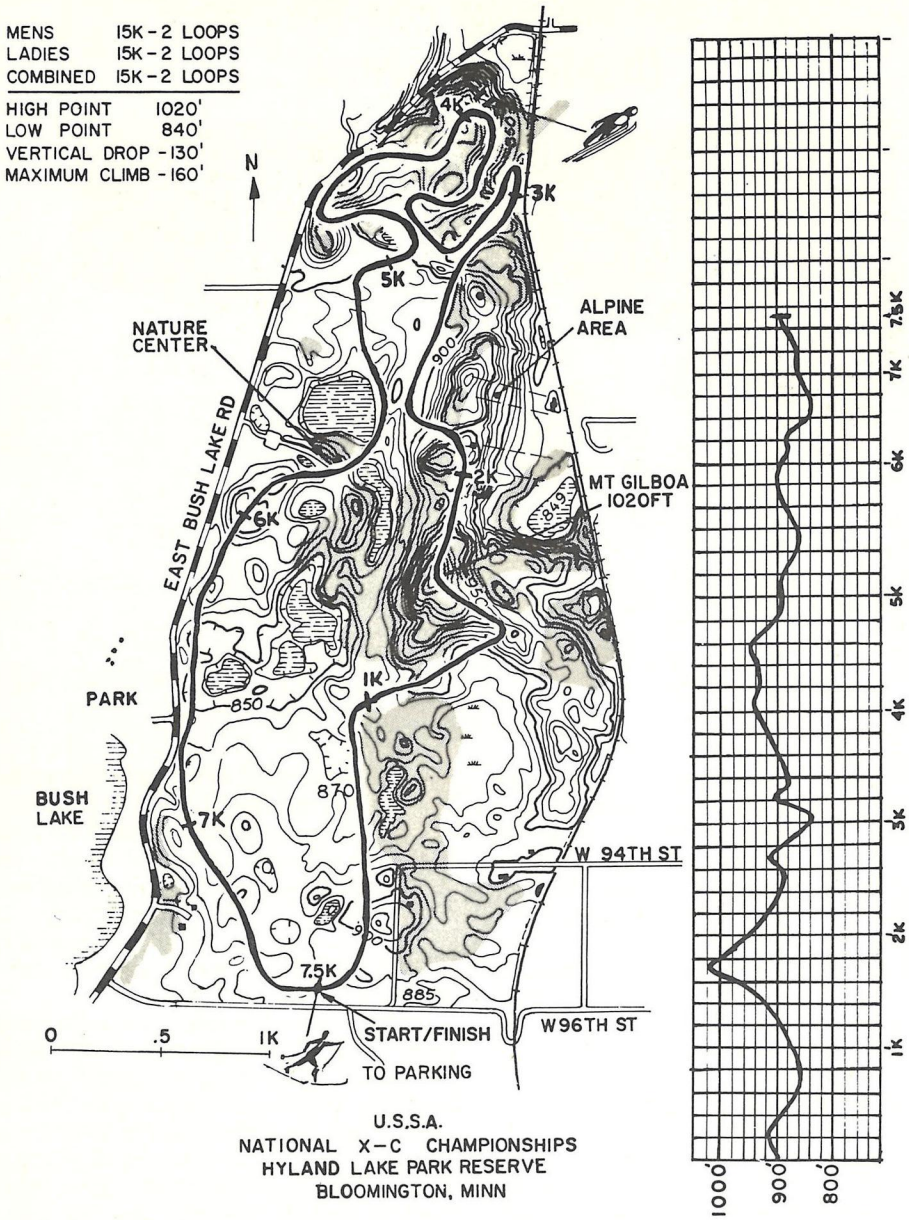
What effect does X-C ski racing have upon the average or plodder type of X-C skier? Any racer is a perfectionist type of individual, and tries to get the best results out of a given effort. This applies to canoeing, where effort is always made to improve on equipment and paddling technique. Likewise, the average X-C skier looks to the racer as a guide to improving his own technique, and some experiment with racing type equipment.

The trend of ski touring in America is going the same direction as it went in Norway––toward light-weight equipment. The racer was the pioneer in the development of light gear. Tourers are finding they can perform as well or better with the light gear. The lightness allows greater mobility. The average beginner can learn to handle the lighter narrower ski in a short time, but the standard touring ski has a psychological advantage. It provides a more steady feeling. The person that will get away from an established trail and maybe do winter camping should stay with the standard touring width. The width will be an advantage when carrying a heavy pack, and in deep powder snow. Generally, design features concern camber, flex, width and floatation.

In the Nationals race, there is one main course with a double track, and several cut-offs for different length races. The distances are given in metric measure. A kilometer (km) is approximately 6/10 of a mile. The course has been described by a USSA official as one of the most outstanding that he has seen. A good track will have features such as banked turns on downhill runs so that each ski track remains intact. The Hennepin County Park System is to be commended for their effort to make this quality track possible. The course will continue on as part of the trail system that has been developed in five of the park reserves. This is an example of how X-C ski touring is coming of age in our area.

The Nationals race is billed as a participant sport. Don't just plan to come and be a spectator. BRING YOUR SKIIS! There will be additional tracks in certain areas along the race course for viewers to compare their skill with the racers. Also, a touring trail around Bush Lake is established for the recreational skier.

The U.S. Ski Association has about 150,000 members. It is divided into nine divisions. The Central Division encompasses eleven states in the midwest, and approximately 20,000 members. Each division has a governing body and conducts its own programs. An event such as this national championship is governed by



racing as we saw at the Summer Olympics. Neither do the canoeing racers have a corner on the technique of psyching the other fellow out.

Note the contour map showing the course for the various length races with the elevations plotted on a graph alongside. It will pretty well show the difficulty of the course. Each race starts and finishes at the same place. There is a double track the entire distance, so there will be more sprinting type of action among the racers, instead of just seeing a string of skiers following each other. This usually provides more competitive action.

In the relay events there are four members to a team. Each team has a number and the bibs are of four different colors, so that it is easily known which lap any team is on.

The importance of this race to the competitors is great. Making a good showing here is a deciding factor in making the national team. The winner of any one race will log 100% and the slower racer will log a lower percentage score. Each racer will end up with one overall figure for the week. His chance for a high score is better if he competes in several events. By making the national team, he will travel to Europe for international competitions and represent the U.S.A. at these events.

The USSA Nordic National Championships should help provide some exciting days for the X-C ski bug. So, see you there with your "Nordics" button and your skis, Jan. 28th through Feb. 4th.

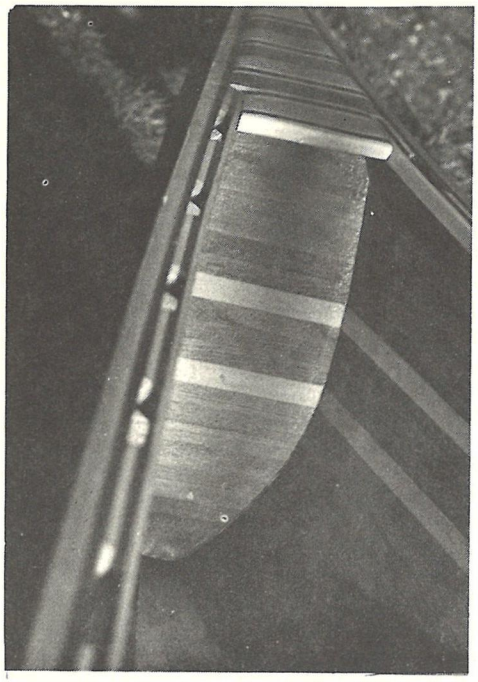
by Roger Geis

the national committee. Hosting of national events is rotated among the various divisions. Financial responsibility for hosting this championship race rests with the organizing clubs. For this race they are the Minneapolis Ski Club and the North Star Ski Touring Club. They deserve the individual support of everyone interested in X-C skiing for bringing this race to the twin city area. The simplest way to do that is to buy a "Nordics" button for $1.00. There isn't any admission charge during the week for the races, but this button serves as an admission for the jumping events held on Sunday, Feb. 4th, at the Bush Lake Ski Jump.

The timing equipment used in the Nationals is very elaborate. It consists of special Longine timers and clocks, with computers for documenting elapsed time for each racer. All details in this event are handled with this type of precision. One example would be the board at the starting location that posts snow temperature from a number of stations on the track. This is of utmost importance to the racers, so that they can wax for the existing conditions along the course. This is another refinement that the average skier can learn from the racer. All of the wax charts that give temperature ranges for the different colors or types of wax are based primarily on snow temperature and not just air temperature. Every racer is quite knowledgeable about waxing and what works best for him. He doesn't go around advertising how he is waxing for the day, but there really isn't as much deception about waxing as stories would make it seem.

There is a degree of cunning and strategy that takes place in top calibre races. Most of the veteran racers know their competitors strong and weak points. A veteran may choose to follow on the heels of a newcomer for a distance to find out how well he can take the uphill stretches and how fast he recovers from them. Each skier has his own preference as to how he paces himself. Any disturbance of this pattern could put him out of the race. This is much the same as in distance foot

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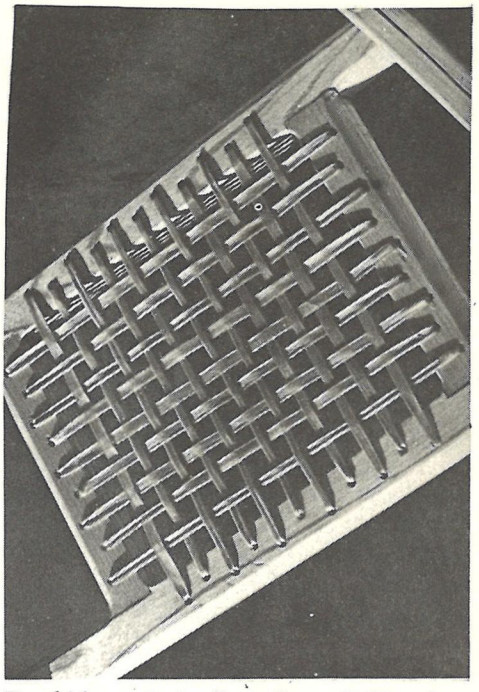
Flotation chambers should be filled with solid flotation (styrofoam) and not air.

The Builders' Contest was held last October; but we though the winners and their craftmanship deserved a little more notoriety.

The Builders' Contest

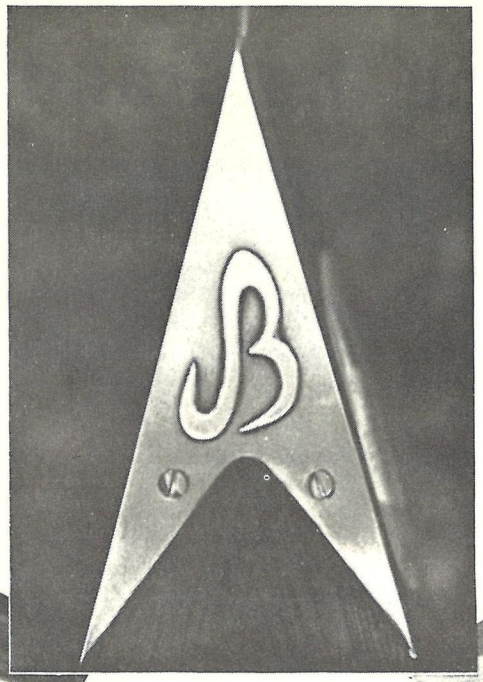
Photos by Karl N. Ketter

Winners of 1972 Canoe Builders contest. (Left to right) Lonnie Anderson (racing canoe), Jim Blackburn (cedarstrip cruiser), Tom Jackson (restored classic), Durkee Richards (fiberglass cruiser) Pete Stanaitis (whitewater boat).



Rawhide seats in first place all fiberglass canoe.





1 Hand made brass deck plate (4" long) on first place strip canoe.

2 Deck is replaced by well finished carrying grip on first place strip canoe.

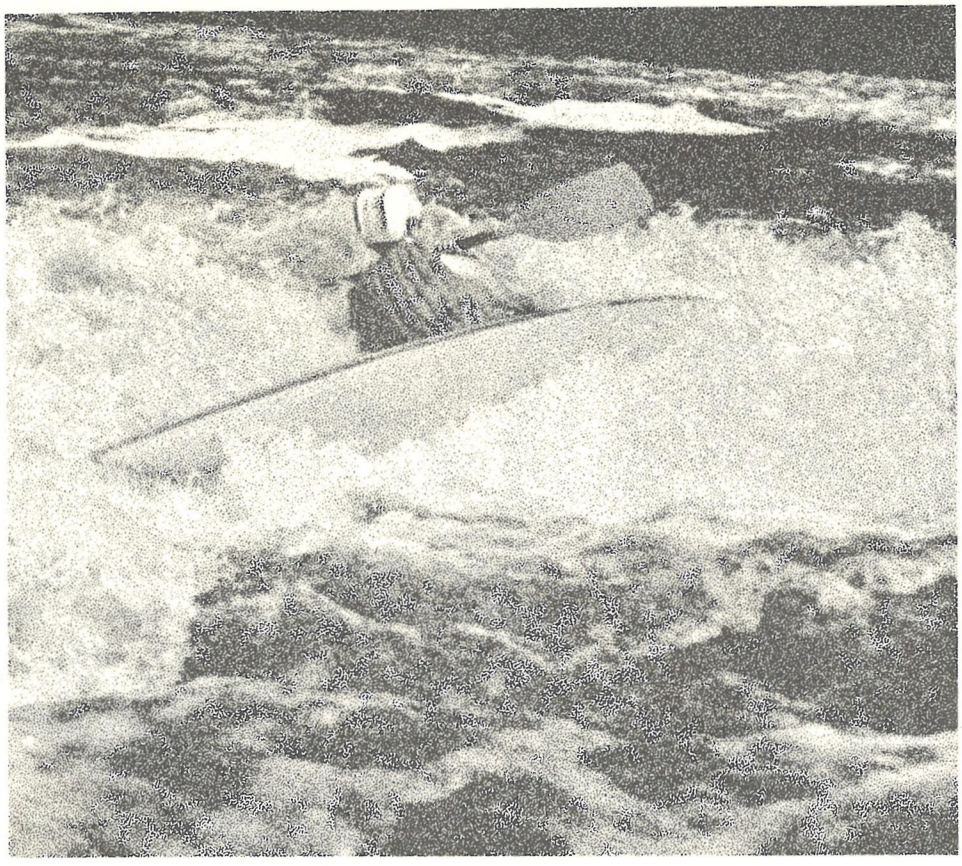
3 Laminated and glassed deck on cruising canoe.

4 Hand-carved deck on cruising canoe.

5 An oakdeck on a cruising canoe.

6 Lonnie Anderson used his initial on deck of first place racing canoe.

Kayaking the Grand Canyon



For me it was a dream come true – a trip down the Grand Canyon. The idea of a Grand Canyon trip was planted by Wisconsin kayakist and engineer, Bill Walker. Bill and I had met on a Sierra Club whitewater trip down the Red River Gorge in Kentucky in the Spring of 1970. Then in the Summer of 1971, Bill worked as a boatman for a Grand Canyon raft outfitter, and we mused the idea of a combination raft and kayak trip down the Colorado. I talked up the idea and quickly found many rafters; however, the kayakists from near Cincinnati, like me, are not able to practice running Class III, IV, and V water unless we drive over 5 hours to Pennsylvania or West Virginia. Unfortunately, Bill wasn't able to go, and I was able to find only one other kayakist to make the trip - a high school senior from Cincinnati, Tom Palmer. The rest of the group rode large neoprene commercial "Grand Canyon" rafts which they had chartered.

The trip started on July 4th from Lee's Ferry. The raft outfitter and the National Park Service had agreed to our kayaking (with raft support). The outfitter had limited us to paddling only at the discretion of the head boatman (a safety-first non-kayakist) who at the outset suggested we ought to leave the kayaks behind. We pointed out that we had permission and we had come almost 2000 miles for the trip. He reluctantly agreed we could bring the kayaks.

The rafts had to wait for the water release from Lake Powell - the enormous lake formed from damming Glen Canyon (sigh). As we waited, Tom and I practiced our Eskimo Rolls in the 50°F. frigid water. Tom did not have a wet suit, and I was concerned for his safety in that cold water; but he said that he would be okey.

Finally we started down - ahead of us were 280 miles with 74 BIG rapids and many smaller ones. The rapids are rated on a 1 to 10 scale in the River Guide; the worst would be classed V or VI in the normal whitewater rating system. Probably 50 of the 74 named rapids could not be run in an open canoe without swamping and would be rated III or above.

The river flow was large - between 10,000 and 20,000 cubic feet per second. The quantity of flow was accentuated by the steep gradient and the confining canyon walls. As we would approach a rapid, we might choose to look it over from shore if it was known to be difficult (we had a waterproof copy of the river guide encased in plastic on the deck of one of the kayaks). On the water again the river gets faster; the surface angles down, and the boat picks up speed. The point of no return comes quickly.

The best passages normally are defined by the deeper calmer water forming a "V" pointing downstream into the rapid. But after entering the wide part of the "V", the large waves at the side may converge on the boat, and the kayak is caught by forceful back-breaking surf-type standing waves. The kayakist quickly learns to close his mouth and take a deep breath before hitting these waves to avoid a quick drink.

Assuming forward motion continues (some of the waves stop forward motion), the speed and force of the water toss the boater into wave after wave, with only fractions of seconds available to right the boat, brace, and correct the direction - much less paddle! As the trip started, the lack of big water experience made the running of the rapids a matter of survival. As the trip progressed and experience was forced on us, we got a feel for balance and were generally able to place the kayaks in good position for the coming challenge.

For the benefit of the readers who are new to whitewater paddling, some descriptions of kayakist technique may be interesting.

A PADDLE BRACE is where the flat of the blade is pressed against the surface of the water to act as an outrigger for stability.

A LEAN is where the boater partially tips the boat, using a paddle brace or bending at the waist to prevent the boat from becoming unbalanced and unstable. A lean is used to present the bottom of the boat to a cross current. Using this technique, the boat floats on top of, rather than is rolled over by the cross current (or current differential).

An ESKIMO ROLL is the technique where an overturned boat is righted by action of paddle against the water. Probably the most important skill in Grand Canyon kayaking is an "automatic" eskimo roll. By knowing that if turned over you can roll the boat up with a paddle stroke, you have confidence that you can recover from a spill without a tiring swim to shore in swift, cold water.

The types of obstacles we encountered on the Colorado were:

CURRENT DIFFERENTIALS - where swift cross currents tend to catch the boat and turn it over.

GIANT WAVES - when regular and not breaking, these waves were a lot of fun and somewhat like riding a roller coaster.

HOLES –where a back-breaking wave carries you upstream and the previous wave and main water flow carries you down stream. The bulk of the water flow dives under water as an underwater jet. Most bad holes are just down stream of rocks. If a boat is caught sideways or if forward motion is lost, a hole can hold a boat and rider in the turbulence for what seems like a lifetime - up to a minute maybe! Most of the time the boat is tumbled like a cork - and in the Grand Canyon, some

of the holes were big enough to swallow up the 13'x30' rafts!

AERATED WATER -as water becomes mixed with air, it no longer will float a boat!

On this trip, because of time restrictions (we had to cover the 280 miles in 10 days), and because the motorized rafts were faster than the kayaks, we were obliged to kayak only when there was time in the schedule. Also, the safety conscious head boatman had his doubts about our safety in the more dangerous rapids. As a result, we would lash the kayaks securely on top of the cargo when we were not paddling. As it turned out, we paddled about half the rapids in the Grand Canyon, but we did not attempt to kayak any of the most dangerous and most difficult rapids. However, neither of us who had been kayaking felt cheated in the least - we had paddled the most challenging water we had ever paddled; we learned a heck of a lot; and we still have something to look forward to for the future.

I must have been asked a dozen times, "Why would a sane person want to paddle in a flimsy little boat like that down a section of river like the Grand Canyon of the Colorado?" I would patiently answer, "Because it's fun and challenging", but then launch into an explanation that we prepared for the trip. We wore crash helmets and "grand canyon style" 33 lb. flotation life jackets. I wore a wet suit which not only protects against cold but protects the skin from abrasion against rocks. For the big waves we wore specially made spray skirts which keep the water out of the boats but comes off the boats easily if necessary. We used the best paddles we could find for light weight and sturdiness. Also, our boats were of strong construction and will withstand almost any impact without damage.

I keep in shape by whitewater kayaking whenever time and money will allow the extensive travel to good whitewater. Locally, I enter marathon races to stay in shape (and to collect a little hardware for the family room). When paddling unfamiliar water, I scout to ascertain that hazards such as transparent obstacles, holes, etc., don't make the risk of the rapid more than I want to try.

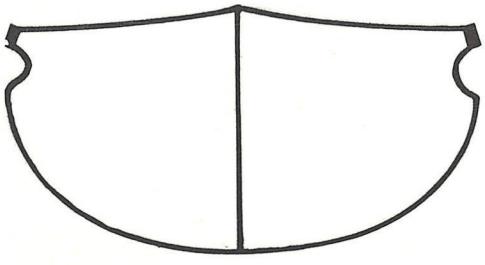
As I have written about the kayaking in the Grand Canyon, I wish I could take many more hours or pages and describe the unique beauty of the wilderness setting, the panorama of geology which is unsurpassed anywhere, the side canyon waterfalls, and the fellowship of our group as we made our way down the canyon. However, maybe it is better this way - perhaps you will take the trip and experience the grandeur yourself.

Canoe Building and Weight Considerations

by Curt Mommsen

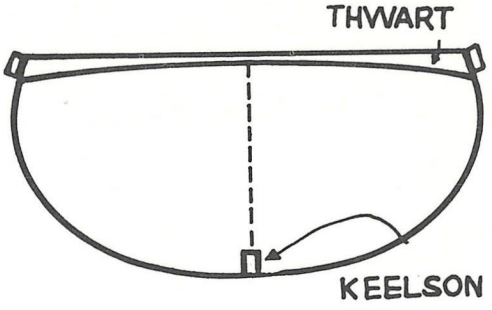
I'm sure that anyone who has ever built a wood strip canoe has wondered how it could be built to weigh less. Many of the wood strip canoes entered in the canoe building contest at O'Brien Park this fall (see photo essay on the contest in this issue) were roughly in the 60 pound bracket while the canoe paddled by Gene Jensen and Jean Guy Beaumier in the Aquatennial Classic weighed in at 24 pounds. From the comparison it must be obvious that there are still some tricks to that race. I don't intend that you read this article and rush out to the garage and start an ultra-light weight canoe. I only want to point out some of the more important ingredients in, say, a 16-foot Guide or 17-foot Explorer in the 40-pound bracket.

1. Pick the wood for the strips very carefully. This is extremely important as nearly one-third of the weight of the finished canoe is in the wood strips. One redwood board, for example, can weigh as much as two lighter boards of exactly the same size. Western red cedar is usually somewhat lighter than either redwood or spruce; however, it may be possible to use slightly thinner strips when using redwood or spruce as these woods tend to be stronger. Northern white cedar is dependably light in weight but in short supply.
2. Use thinner strips above the water line than in the bottom. A Guide or Explorer model can be built with approximately 7/32-inch thick strips in the bottom and from 1/8 inch to 5/32 inch above the water line. Wider canoes and canoes with flat bottoms generally require thicker strips.
3. Use 4 ounces per square yard cloth inside and out. For a stronger hull a second layer of 4-ounce cloth may be used below the waterline on the outside. Also, some weight may be saved by omitting the glass from the sides of the inside of the hull.
4. The hull can be stiffened considerably by building a channel into each side of the hull just below the gunwale as shown in this sectional view:



This added stiffness may allow the use of strips of approximately 1/8-inch thickness above the water line. A nominal amount of "tumblehome" also adds stiffness to the hull.

5. Polyester resin weighs just over 9 pounds per gallon. Indiscriminate use of resin may add many unnecessary pounds to the finished craft. The resin thickness can be kept to a minimum by using a squeegie.
6. Use a soft wood outer gunwale approximately 3/8 inch wide by 3/4 inch high. If an inside gunwale is to be used, some weight can be saved by cutting out generous notches.
7. If decks are to be used, keep them as small as possible while still affording an ample hand hold.
8. Redwood, spruce, or cedar can be used for seat parts. The seat front and back members should be 3/4-inch thick by approximately 1-1/4-inch wide. The side seat rails can be narrower, usually 1 inch wide is adequate.
9. A hull which has been built to be minimal in weight can be stiffened considerably by the use of three thwarts as shown in the section below.



The thwarts are fashioned from 3/4-inch by 4-inch soft wood used with the 4-inch vertical dimension. Note that the thwarts are narrower at the center and approximately 4 inches in height where they are secured to the hull by use of glass pieces and resin.

10. A light hull can also be stiffened greatly by the addition of a keelson (see the above drawing). This can be made of soft wood approximately 5/16 inch or 3/8 inch wide by 2 to 3 inches in height and secured with glass and resin down the center of the hull.

There are additional ways in which weight may be trimmed from the total weight of the finished canoe; however, the above suggestions may enable any builder to become more conscious of the weight aspect of building and therefore profit by the experience of others.

MCA States Views on BWCA

Harold E. Anderson, Supervisor of Superior National Forest, has requested the MCA as well as other organizations interested in the fate of the BWCA, to present our views on the Boundary Waters. The following is our response.

We welcome this opportunity to comment on the issues to be covered in the proposed Land Use Plan being developed by the Forest Service for the Superior National Forest and the Boundary Waters Canoe Area. Because of the extreme importance of the latter, we prefer to treat it separately from the Superior National Forest. Briefly, the Canoe Association's ideas for managing the two areas are:

1. The BWCA should be managed in the true spirit of the Wilderness Act, namely as a primitive area with as little interference by man as possible. It should be managed as a total ecological unit, not as a series of smaller ones with different, or conflicting, purposes.
2. The Superior National Forest outside of the BWCA should be managed not necessarily as a completely primitive area, but as a renewable forest resource under the multiple use concept. This would include economically feasible timber harvest and timber management, wildlife habitat, recreation, and other considerations.

- VEGETATION -

Boundary Waters Canoe Area. The BWCA should be managed as a total ecological unit with as few incompatible human activities as possible. Any management necessary should be close to natural means. Because the vegetation presently in the BWCA is primarily there as a result of natural fires, the techniques of prescribed burning should be studied and adapted to conditions specific to the BWCA area so that they can be used as management tools. The fire may be started by man or, if naturally started, should be allowed to burn according to well thought-out plans. If prescribed burning is not used, the buils-up of vegetation will continue unabated by natural means and an uncontrolled wild fire could result.

We do not feel that logging in either the portal or interior zones is compatible with wilderness but rather that it should be eliminated from the list of available management options. Logging should be restricted to the Superior National Forest outside of the BWCA because of the shrinking amount of wilderness in the United States. Present timber cutting contracts in the portal zone should not be completed if the Forest Service and the holders of these contracts can agree on termination procedures and compensation or substitution. For example, we suggest that the contract holders be allowed to cut an identical cordage of timber of the same or equally valuable species in the Superior outside of the BWCA.

Superior National Forest. Logging should be allowed in the Superior under the multiple use concept. The Superior could also be used in experimentation to determine proper techniques for managing it as a timber resource as well as for recreation and other uses. We suggest that logging in this area be conducted under guidelines recommended by the Senate Subcommittee on Forestry. These include periodic reviews of the allowable harvest to assure that the lands are available and suitable for timber production; that increases in harvest allowances based on reforestation, thinning, etc. be made only if these techniques justify increased allowances and that proper funds are available and used for these purposes. Some clearcutting guidelines we believe practicable include:

Use of clearcutting be allowed only where:

i. It is determined to be essential to accomplish relevant forest management objectives.
ii. The size of clearcut areas are kept at a minimum and not over fifty acres.
iii. These areas be shaped and blended as much as possible with the natural terrain.
iv. A multidisciplinary review has been made of the environmental, engineering, economic, aesthetic, and biological impacts of this proposed action.

Clearcutting should be prohibited where:

i. Fragile soil, watershed, or slope conditions exist that would be subject to major damage.
ii. There is no assurance that the area can be adequately reforested within five years of harvest.
iii. Outstanding or unusual aesthetic or natural conditions exist which would be compromised by clearcutting.

In all cases where logging was allowed by whatever techniques, the logger should post a performance bond before starting cutting. This bond would be refunded when logging roads were satisfactorily eliminated, the area reforested and other terms of the contract completed.

- MINERALS -

We feel that there should be no mineral exploitation in either the BWCA or the Superior unless a national emergency is declared by the President of the United States and he deems the mineral resources to be necessary for the defense of this country. We feel there should be no on-land exploration done other than by visual or hand-tool techniques but that other non-destructive techniques, as developed, could be used. For example, a fly-over approved and supervised by the Forest Service could utilize magnetic or electronic instrumentation. The eventual goal should be for the U. S. government to value and purchase all private mineral rights. Such valuation should be done in the least destructive method available at the time.

- WATER SUPPLY -

Boundary Waters Canoe Area. The dams presently in the BWCA should be allowed to continue to disintegrate as they have been doing for the past several decades.

Superior National Forest. On areas outside of the BWCA, some dams would have to be maintained to protect certain areas where man has intruded. However, the establishment of new dams and level controls should be allowed only to protect the area from hydrological disturbances originating outside the area. Other dams in this area should be allowed to disintegrate if such action posed no threat or problem to the remaining area as determined by the Supervisor of the Superior National Forest.

- MOTORIZED VEHICLES -

Boundary Waters Canoe Area. We feel that motorized vehicles of any type are inconsistent with a primitive wilderness area. An ultimate goal of the Forest Service, therefore, should be the prohibition of any motors in the BWCA except for use by Forest Service personnel. Such a recommendation should be strongly made by the Forest Service to the U. S. Congress repeatedly until such a law is passed.

For the present, we suggest the concept of temporal zoning of motors. This would involve the prohibition of motors in most areas except for the early months of the fishing season when motor use is greatest. In some areas of continual present heavy use, they would not be restricted immediately. We feel that all snowmobiles and off-road recreational vehicles should be banned from the BWCA. The Wilderness Act specifically mentions established uses of motor*boats*. A snowmobile or other recreational vehicle is not a boat but rather has a different influence on the land and its residents and other users. These should be prohibited.

Superior National Forest. Motorboats and other motorized craft should be allowed in the Superior, following the guidelnes of President Nixon's Executive Order of February 8, 1972. We feel that a reasonable number of trails of reasonable length should be established or maintained in the Superior for those vehicle types determined by the Supervisor to be compatible with the area involved. The use of all types of motorized vehicles should be continually evaluated regarding their use, abuse, and impact.

- PEOPLE AND LAND USE -

We feel that dispersal of parties is essential in both the BWCA and Superior and should be strongly recommended. This might be accomplished by an improved educational system which would present information on some, but not all, areas and access points with lesser use. We feel that this information should not be given on all areas but rather it be learned by those making repeated visits to the BWCA and Superior.

Another need is for an information center in the metropolitan Twin City area. This center would be capably staffed and would have the function of accurately describing the experience obtained in the various parts of the BWCA and Superior so that people not interested in the wilderness areas would be discouraged from using them. They would be given suggestions on other areas in the Superior and Chippewa National Forests which would be more compatible to the type of experience they seek. We also suggest that camping in the areas at the edges of the BWCA be discouraged as these funnel many people into the area who are not prepared to respect the wilderness area.

We also recommend denial of permission to local authorities for the upgrading of the Echo Trail and other roads where they cross Federal lands. A road only needs to be traversable, not a first class highway. Wide, paved roads have an adverse effect on the adjacent primitive areas.

★★★

Some friends of ours nave an interesting thing going for them, and for everyone else too. They publish the Ecology Placement Service. It's a monthly newsletter listing jobs and funded study opportunities dedicated to the preservation of our Spaceship, and probably our souls as well. Write to Ecology Placement Service, 1711 Lincoln Ave., St. Paul, Minnesota 55105 or call 690-3516.

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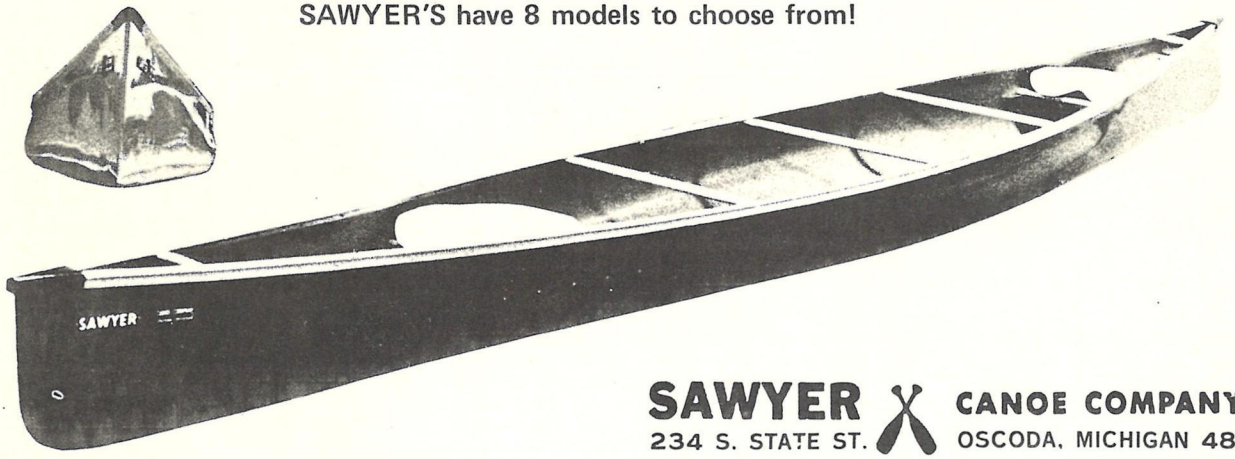
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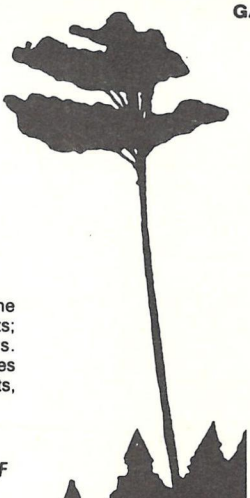
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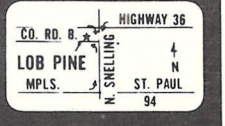
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