EQUILIBRIUM¹

Sometimes little events make big points. When it comes to the out-of-doors, television, magazines and advertising sell the adrenaline rush. Kayaks dropping off of 40 foot water falls, the biggest drops in the East, the extreme boaters pushing the limits of paddling are typical topics which feed the adrenaline rush type of experience. There are even TV shows and events on a TV sports channel that televises these extreme sports on a regular basis. Unfortunately, for most of the public the adrenaline junkie extreme sport rush of whitewater becomes the stereotype of what they believe the whitewater experience is all about. Because they have never experienced alternative models, they often believe that it is this type of experience that they should obtain from their canoeing or kayaking.

For me the purpose of the whitewater experience isn't to seek an adrenaline rush. Don't get me wrong. An occasional adrenalin rush is refreshing. However, to me whitewater boating is more akin to ballet or dance. It is equivalent to watching a fine gymnast executing precise moves with what looks like simple ease. For me, this experience is very different than that of the adrenalin junkie. It is a balance of forces coming together and it is my ability to master those forces to create harmony between the natural elements found on the river and my boat and paddle. My strategy is not to conquer and subdue the power of the river, but to use the force of the river to my advantage. It is the creation of equilibrium and balance among all of these forces. And when that equilibrium is obtained, I become at one with the boat, water and the movement of my boat through the water. My moves have grace and precision. They create an aesthetic experience. This aesthetic is equal to and even surpasses the experience offered by an adrenalin rush. Unfortunately, this aesthetic experience is often overshadowed by a culture that is fixated on the creation of adrenalin for adrenaline junkies.

In a recent basic river canoeing course, where I taught a new generation of canoe instructors, I had the opportunity to introduce these students to the concept of paddling as an aesthetic experience while teaching them to side surf a hydraulic. In this simple activity, the students learned the subtly involved in paddling. They learned the importance of balancing forces rather than overpowering the force of the river. They learned the importance of something so simple yet so complex. They learned that something so simply as inserting the paddle deeper or less deep in the water can affect the performance of the boat. They learned the effect on performance that rotating the blade a few degrees in the water can have in making the boat do whatever it is that they want the boat to do. The simple activity of side surfing a hydraulic afforded me the opportunity to make a big point about the paddling experience.

There are a host of names for hydraulics. They are known as souse holes, reversals, keepers, hydraulics, or simply holes. I tend to refer to them as holes because as the water attempts to fill the void behind an obstruction in the river, a depression or hole is formed in the water behind the obstruction. Water seeks its lowest level. If there is a depression in the river, the water seeks to fill that depression. A hole is formed by an obstruction in the water flows over the top of the obstruction to form the hydraulic. As the water races over the top of the obstruction, it drops to the bottom of the river in the void behind the rock in the river. If there was little or no current, the water simply fills up the void behind the rock and there isn't much of a hole in the river. However, as the speed of the river increases, the water rushes over the top of the obstruction with considerable speed. It races over the top of the rock and then plummets to the bottom. Its inertia and velocity causes it to race downstream also. Plummeting to the bottom of the river, it actually digs a hole in the river straight upward and back toward the surface of the river.

When the water reaches the surface, it does one of three things. Some of the water surfaces far enough downstream of the rock or obstruction that it conintinues its journey downstream. At first, it moves slowly downstream and then it quickly regains the same speed of the water in the main channel.

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Next, some of the water surfaces close to the rock or obstruction. However, because the water rushed over the rock and plummeted to the bottom of the river, there is now a depression or hole behind the rock in the river. Since water seeks to fill all depressions, this water races back upstream toward the rock in an attempt to fill in the hole or depression behind the rock. This water flows downhill toward the backside of the rock and meets the water coming over the rock that is plummeting toward the bottom of the river. It meets this plummeting water where it immediately gets recirculated downstream. It is easy to imagine that this water surfaces nearest to the rock and immediately recirculates back toward the rock or obstruction. Intuitively, the recirculating portion of water in the hydraulic is what makes a hydraulic a killer or a fun place to play. A low head dam is a killer. It has a perfectly formed hydraulic behind it that extends the entire width of the river and the hydraulic will recirculate its victim endlessly in it. Also, a rock or other natural obstruction may create a perfectly formed hydraulic that tends to play with you rather than having you playing in it.

Last, some of the water comes up between the water that is moving downstream and the water that is moving back upstream to fill the hole. It is a neutral current and in a very real sense, this water is literally sandwiched between the upstream and downstream moving currents. It is called the boil. It moves vertically toward the surface much like the old drinking fountains where the water shoots vertically and creates a boil where the water falls down on itself.

To the untrained eye, the water behind a hydraulic looks simply like it is churning or is chaotic in its movement. However, to the trained eye, the flow of the water is easily discernable into these three distinct flows. Intellectually, these currents are easily explained in a simple diagram. Even a relatively inexperienced student can easily point out these three flows to others and to the instructor. However, to feel the effect of each of the three currents on the boat as it pulsates and moves about in these currents is not such a simple thing to do.

When teaching students to side surf a hole, I like to find a small hole in which I can safely wade into the hole and stand next to the student paddler. Hopefully, the hole is big enough that it has some power and bite. However, even small holes which are difficult to surf without the instructor's assistance are useful. From a teaching perspective, this approach offers several distinct advantages. First the instructor can talk to the student rather than yell at them from shore twenty feet away. Also, the instructor's comforting voice next to the student is reassuring and conforting. Second, most students don't want to capsize and swim in the hole. They would rather not enter a hole if they think that they might swim. Normally, The instructor can easily prevent the student from capsizing by simply holding the gunwale. Third, the instructor can physically make corrections in paddle stokes and in boat lean. For example, the instructor can simply reach over and make a five or ten degree change in the angle of the blade. This small correction maybe all that is needed to effectively maneuver the canoe. If the upstream current is grabbing the edge of the canoe and potentially capsizing it, the instructor can gently lift the gunwale so that the boat has the correct lean and doesn't capsize. Fourth, the instructor can manipulate the experience so that the student learns more quickly. For example, if the student goes too far into the hole and will wash out the backside of the hole, the instructor can simply returns the student and the canoe to a position where the student can start again and learn the lesson correctly. In terms of energy conservation by students and overall fatigue, the benefit of this approach is extremely valuable. In addition, most beginning students don't have the capability of paddling efficiently upstream let alone to paddle with the preciseness to take a correct line that will enable them to enter the hole efficiently, if at all.

In addition to developing an ability to sense these three currents, the student needs to develop his or her "J lean." The water plummeting over the rock or obstruction has power. This water acts like a thousand little hands on the side of the canoe that try to grab the upstream side of the canoe and flip it over. Hence, students need to learn to lean their canoe by pressing down on their one knee and simultaneously lifting up with their other knee. The trick is to lean the boat while keeping the center of gravity of their body inside the boat. If they lean outside of the boat, they become unstable and they will fall out of their boat and into the water.

Cheryl's experience was typical of most students in the course. On the mile and one half section of the French Broad River from it headwaters down to Champion Park, there was a small diagonal hydraulic next to the park formed by a rock barrier that the State had installed as part of their fish habitat improvement efforts. This year, the water was higher than normal and this normally exposed rock barrier had a small hydraulic behind it. It was a suitable teaching station and it was ideal for teaching these students how to surf a hydraulic. In addition, it was suitable to teach them the understanding of the concept of balance and equilibrium.

Holding the bow of her boat, I gently nudged it toward the hole. With me holding firmly onto the canoe's gunwales, Cheryl's canoe was perfectly stable amidst the seemingly turbulent water all around her. With her boat next to me she could feel the downward pull of the water pouring over the top of upstream rock. I relaxed my grasp on the gunwale. She could feel its bite and its power. The boat rocked upstream. With the sudden look of apprehensive on her face she intuitively knew that she was about to capsize and go swimming. She was not in control. Fortunately, she didn't go swimming. I caught the gunwales and righted the boat. We practiced her "J lean" and she did the same exercise again. Using the lean, she exposed less of the side of the boat to the upstream current and she was able to maintain control. Her look of apprehension gave way to a broad smile across her face. She possessed the first element needed to side surf this hole.

With the hole directly in front of her, we reviewed the three currents behind the hydraulic. This close to the hole, Cheryl could clearly see that the water flowing back upstream was also distinctly flowing downhill. So even though her canoe was pointing upstream it was actually going downhill. We nudged her canoe onto the downhill flowing water. She could feel her canoe beginning to slide downhill and into the hole. Before she could wash out the other side of the hole. I gently stopped the canoe and held it where it was. With my assistance, she was side surfing the hole. Then she relaxed her "J lean" and I gently reminded her of the need to maintain it as she felt the bite of the upstream current against the boat again. Jokingly, I told her that she just went swimming. She laughed.

Now it was time for her to add another element to the equation. I instructed her to use a high brace on the downstream side of her boat. The high brace is a stationary stroke in that the stroke remains stationary and the force of the current against the paddle turns or moves the canoe. In this case, the stationary draw caught the downstream current of the hydraulic. If the stationary draw catches enough of the current, it will move the canoe backwards and out of the hydraulic. The trick is to maintain just enough pressure of the current against the paddle to maintain equilibrium. Equilibrium means that the force of the current against the paddle equalizes the downhill slide of the canoe into the hole. If the current against the paddle has too much force, the canoe backs out the near side of the hole. If there is too little force against the paddle, the canoe slides downhill into the hole and out the other side of the hole.

Normally, the angle of the blade in a high brace is parallel to the boat. When side surfing a hydraulic, the angle of the paddle blade is normally perpendicular to the current. In this position, the boat will remain stationary in the hole. Since this was a diagonal hole, a normal high brace resulted in some of the current pulling against the blade. In this hole, Cheryl's high brace tended to move her out of the hole. Regardless, she still needed to learn the concept of blade angle and how far to insert the blade into the water. Her goal was to maintain equilibrium where she neither moved into or out of the hole.

I instructed Cheryl to rotate her paddle in the water until she could feel the maximum bite of the current. As she turned her paddle in the water, it had more of a look of a stationary draw than a high brace. Regardless, it did the same thing. She noted that she could feel the difference in the force of the current against her paddle. So simply by rotating the blade of the paddle in the water ever so slightly, she could maximize the current's force against her high brace. In a larger hole, the angle of the blade would become more important. However, in this small hole, she didn't need the extra force. Never-the-less, learning the feel of where the maximum force of the water was exerted against the blade is an important concept to learn.

The second concept which Cheryl needed to learn was fairly simple but not readily obvious. Simply by raising or lowering the blade of her paddle out of the water she could increase or decrease the amount of drag or the force of the current against her paddle. With this simple maneuver, she could control how fast, if at all, the canoe would drift downhill into the hole. Cheryl had the last element that she needed to successfully side surf this small hole.

Since I was stationary in the water, I could easily feel the movement of her canoe as it moved forward or backwards in or out of the hole. My gentle grasp on the gunwales was so sensitive that it enabled me to provide Cheryl with immediate feedback as to which way she was moving. A forward stoke and she started to slide downward into the small diagonal hole. She executed her "J lean" and then her high brace. The high brace engaged the current with the proper angle too. With all that was going on, Cheryl was focused and had a look of extreme concentration on her face. She was dropping too far into the hole. I instructed her to put more of her paddle into the water. She did and the canoe started to move back out of the hole. I instructed Cheryl to lift some of the blade out of the water so that the canoe would begin to slide back into the hole. She lifted the paddle so that only an inch or so of the blade was in the water. The canoe began to move back into the hole again. Cheryl was getting the feel. She was experiencing the subtlety of bringing all of the elements together to create balance and equilibrium. A couple of more cycles of moving forwards and backwards and Cheryl had the canoe where it was neither moving forwards into or backwards out of the hole. And I was not assisting her either. The forces moving the canoe downstream were in equilibrium with those forces moving the canoe upstream. When I told her this, a broad smile emerged across her face. She understood. In addition, she could feel it.

Cheryl sat there. She didn't go forward and she didn't go backwards. All of the forces were in balance. On the one side of her canoe the water rushed furiously past her canoe. Yet her canoe remained stable and didn't move in the water. On the upstream side of the canoe, she could feel the small bite of the water plunging over the back of the rock trying to capsize her canoe. Her "J lean" minimized the bite and she didn't capsize. The canoe moved ever so slightly forward. She inserted the blade a little further into the water. The canoe moved ever so slightly backwards. She removed the blade ever so slightly out of the water. The canoe moved forward. She stood motionlessly in the current of river. Her actions and awareness were one. For this brief moment, the outside world didn't exist; only the activity of surfing the hole existed. She was totally focused. The world rushed by her, yet she stood still. Time seemed to stop. Five seconds past. A minute past. Maybe, it was really only thirty seconds. It didn't matter. The world around her and Cheryl were at one. I noted to Cheryl in a calm and reassuring voice that she was now experiencing the concept of equilibrium.

For a brief moment, Cheryl experienced mastery. She was like the gymnast who had just completed a precise move with what looked like surprising ease. She was like the ballet dancer who executed a series of dance moves. Her oneness with the world around her was indicative of a flow experience. And, no adrenalin was required to achieve it either.

The flow experience was identified and advanced by the researcher, Mihaly Csikszentmihalyi. The characteristics of a flow state described by Mihaly Csikszentmihalyi are similar to those experienced by Cheryl. Her extreme focus and concentration resulted in the merging of action and awareness. She felt what the canoe was doing and immediately took corrective action. She didn't need to analyze her actions, she simply acted. Her focus and concentration concentrated her total being on the activity. For her at that moment, the world outside of the activity ceased to exist. Time as we perceive it seemed to stop or become irrelevant. Csikszentmihalyi developed a simple model to explain how a person creates the flow state. When the experience matches the skills of the individual, flow can occur. It is not guaranteed that it will occur, only that it can occur. If the experience exceeds the skills of the individual, there is worry or if they greatly exceed the skills of the individual there is anxiety. In a sense, matching the skills with the experience creates a balance and a form of equilibrium.

For Cheryl, she briefly experienced a flow experience. With my assistance and guidance, she was able to match her skills with the challenges provided to her. She gained a brief glimpse of the flow experience. It will serve as a model for her as she develops her skills in the future. Having experienced it once, she will be better able to obtain it again. She will develop her skills at paddling so that she can side surf a hole whenever she wants and obtain the flow experience.

Side surfing a hole is only one example of how a person can obtain a flow experience paddling. Carving out precise eddy turns and peal outs will provide her with flow experiences as will other maneuvers she executes on the river. As she develops her skill, she will choreograph her moves with the precision of a gymnast and with the grace of a ballerina. Her eddy turns, peal outs, ferries and other maneuvers on the river will look like a customized dance choreographed by Cheryl to create a flow experience. In time and with additional experience, she will be able to turn on the flow experience when she wants. As she masters paddling, she will be able to turn on the flow experience for herself with a flick of a switch, sort of speaking. A switch that she has learned to turn on and off at her command. Flow is about creating harmony, balance and equilibrium. The aesthetic experience in the mind that it creates is a good alternative to adrenalin.

Adrenalin is a powerful drug. For some people, it is addicting. Over time, in order to obtain the same adrenalin rush, a person generally requires bigger and bigger challenges to create the same effect. The problem is that at some point the absolute risks become quite risky and the probability of becoming injured or even killed becomes quite real. Unfortunately, like any drug it takes increased dosages to remain effective. In addition, there is a philosophical issue as to whether this is really an appropriate way to interact with the outdoor or natural environment. Philosophically, it is in opposition with the concept of flow and it emphasizes the attitude of conquering and subduing nature rather than seeking harmony

with it. The emphasis is on conflict and not on harmony and balance. The outdoors is used to facilitate and emphasize this conflict. This is why the adrenalin approach to canoeing is not good recreational engineering.

Cheryl's side surfing the hole is an example of good recreational engineering. It provided her with an opportunity to learn a complex maneuver quicky, safely and correctly. Also, it was an efficient teaching station in that she could learn all of the parts and the whole too. I reflected to myself how it took me a year to learn to correctly side surf a hole on my off-side. Everyone said to lean and I leaned out over the boat as they had told me to do. Unfortunately, on the off-side, the high brace is less effective and I kept falling into the water. With time, I learned that I had to lean the boat only and to keep my center of gravity within the boat. I did and successfully side surfed a hole on my off-side. Unfortunately, the instruction that I had received was less than correct.

However, of more importance is that when we teach students the technical skills we must also teach them the overall experience or benefits provided by the activity. The instructor cannot assume that the student understands the psychological benefits of any outdoor activity. They need to learn this too as part of their instruction. Side surfing is a means to the end. The end is the experience derived. The question is which experience are we preparing students. Is it one of flow or is it one of an adrenalin rush? It is one of creating flow. It was one of seeking harmony among the natural forces and one of creating balance and equilibrium. For Cheryl, the instruction gave her a glimpse of what can be. For me, it was a small event that reminded me about bigger things. It reminded me of canoeing as the aesthetic experience that should be.