

Rowing in a Nutshell: Sculling (and Sweeping) with Ease (#12, 4/08)

Trying for more ease and less work for speed at the transition points from the drive to the recovery (Release) and from the recovery to drive (Entry) and during the drive through stability. Some notes in a nutshell on rowing from observations, a common sense approach.

“Form follows function”-Louis Henri Sullivan, 1896
Sandy Koufax, 1996

A good general rule is; think of yourself as a piece of the equipment. If your frame is unstable, you and your boat will be unstable.

1.The Release

It is important to make yourself a **Fortress of Stability** here. At the finish of the drive, your hands should be on as close to the same plane as possible and your elbows should be angled out from your sides pushing firmly into the blades. (all right, we can call them” pelican wings”.) While we like to think that there is no beginning nor end to the rowing stroke, **THIS IS WHERE IT BEGINS!** Keep a “vertical orientation” with your weight above the handles. While keeping your shoulders down, and shoulder blades “in your back pockets”. Do not allow your elbows to fall below your hands. **Push the blades out with your legs**

rather than pulling them out with your hands. When the backs of your knees hit the seat deck, tap the blades out from your core, using the back of your hands with your forearms hinged at the elbows. This motion is very similar to how you would push yourself out of a swimming pool with your hands on the pool deck pointing toward each other and your elbows out and stable (rock climbers call this “mantling”). Do not feather the blade out using your wrist. This will not give you enough clearance to avoid waves or keep your blades clear of the water. Feather and square the blades using your knuckles rather than wrists (see note on Feathering).

Keeping your trunk still and bracing your trunk and legs use the energy of the drive and simply change the direction of the oar handles as though you were, in the words of Allen Rosenberg, releasing a frisbee, allowing the handles to swing away without effort. Do not rest at the release. **Rest with your hands away.**

Suggested Drills:

- 1) King of The Mountain
- 2) Square Blades Rowing
- 3) Feet-Out

2. The Recovery

The main goal of our recovery is to establish stability with your blades off the water which allows us to begin **to become one with our boat in movement** so that we can

make the entry as quietly and with as much length as possible.

It is essential that your hands follow as close a pattern of self-similarity, on the same plane, as possible. The motion of the hands should be down parallel to your belly as you extract the blade, then parallel to your thighs (down toward your knees) and then once there is no longer a danger of hitting your knees, parallel to the water. **Use your elbows to send the handles away from you, and to keep pressure on the pins.** Just as the forearms hinge down from stable elbows at the release, the hands/arms swing away after the release while keeping pressure into the blade. They now hinge outward as we begin our “reach”. **(Any unstable movement of the elbows, any movement which removes your frame from the boat as felt in the elbows will have the same effect as having your riggers loose. Think of yourself as a piece of the equipment!)**

The arms swing out easily, following the energy of the drive. Your grip on the handles is as though you are holding a sparrow which you do not want to fly away yet still want to avoid harming. Keep your sternum up and make sure that your knees are not “locked” after you have “released the Frisbee” and before you have rotated your pelvis. The “orthodox” method is to have the left hand lead slightly ahead of the right; however, it does not make much of a difference if you lead with the left or right. Most sculling boats in this country and Europe are rigged with the left oarlock slightly higher than the right. This is done so that our hands will not collide with each other as they come to the “crossover” point of the recovery. I feel that it is much better in terms of symmetry and stability to have the hands as close to the same plane as possible with one leading the

other out on the recovery and following it in on the drive. As the left hand leads out of bow, the second knuckles (middle knuckles) of the right hand should brush against the base of the thumb of the left hand. It is important to make this gentle contact so that you have the tactile reinforcement of your symmetry. If you are able to set your oarlocks at the same height, do so. **Make a commitment to get your hands low enough (pushing them down towards your knees) to keep your blades off the water.**

The recovery is divided into two phases: **The Reach and Body Preparation Phase** and **The Length and Entry Phase**.

Reach and Body Preparation Phase: rotate your pelvis, making sure not to lose the pressure against the pin toward the blades.

Relax your belly and allow your knees to come up after your hands are no longer in danger of hitting them. Track your knees toward your toes. Body angle and arm extension, the distance of the handles from the body, should be accomplished before the seat begins its movement into the stern. Be careful not to reach so far as to pull the shoulders out of the sockets or the shoulder blade off your rib cage. This completes the Reach/ Body Preparation Phase.

Length and Entry Phase: from this position of established reach and body angle/preparation, our length now comes from the continuous separation of the handles from your core as you continue to apply pressure now backwards against the pins towards the blades **through your elbows**, not your hands nor esp. your thumbs. It is important to **relax your legs** and not use them to pull yourself into the stern. Imagine that you are sitting on a skateboard with your

hands on the sides of a doorframe. Now, propel yourself through the doorway by pushing yourself through it by pushing out and back towards the blade. The legs are not necessary for this and, in fact, any tension in them will only create difficulties at the entry. Keeping your core firm and body angle set and handles the same distance from your body, continue to push the handles apart, **applying pressure against the pins toward the blades through your elbows for the remainder of the recovery through the emersion of the blade and first moments of the transition into the drive.** If the boat is slightly “off balance”, continue to keep equal pressure firmly on both the pins and your weight forward and over the center of the boat (don’t attempt to correct this by raising one or the other of the handles). **Stabilize yourself; do not attempt to “balance” the boat.** Make every effort to have your hands as close as possible to the same plane and keep them in this relative position! The symmetry of the hands while applying pressure against the pin in the direction of the blade will not only stabilize your shell, but will stabilize your body. If you find the boat down to one side, it is best for most of us to just leave it there during that particular recovery. At least it will be somewhat stable. Make the correction at the release of the following drive. Be particularly assiduous in making your release at the correct point (see Drive) and keeping pressure on the pins and making symmetrical patterns as the hands come away. In order to keep “constant pressure” on the pins, **you must match your speed on the recovery to the speed of the boat.** There is no need to think in terms of “slide control”. If your legs are relaxed and you are feeling the pins with constant pressure, the notion of “control” will only tense your legs and create problems such as removing you from

being one with the boat. Timing will become a problem. When you are moving with the boat, as felt by constant pressure on the pins through the elbows, your only issue is being “On Time”. You do not have to be “fast” or early or late, just on time...with the boat.

Stability v. Balance: balance is a difficult concept; stability seems much simpler. In a rowing shell, balance only makes sense to me within the context of Stability. **Stability comes about by keeping constant pressure against the pins in the direction of the blades while making consistent symmetrical patterns with the hands/handles. It comes from making yourself stable** and supported by your elbows. When we keep the pressure on the pins, we increase the surface area of the shell out to the pins. The boat becomes over 5 feet wide! When we focus on the balance, especially by using our hands, or our feet or wiggling about on the seat, we **shrink the shell to this narrow needle that becomes a problem to set!** We start to chase this elusive ghost called “Balance”. Certainly there is a small percentage of Rowing Deities who can balance a shell seemingly without the slightest idea of how they are doing it. **Stability is for the rest of us!** During the recovery (and drive for that matter) your job is, in the words of the famous rowing coach Steve Fairbairn, to not let your rigger rise, or riggers in the case of a sculling boat. We do this (all together now) **by keeping a constant pressure against the pins in the direction of the blades and making consistent symmetrical patterns with the hands/handles.** Our core strength/stability is transferred into the riggers/pins through our elbows.

When we are introduced to rowing, we are taught first to lift one hand, then the other and note the effect this has

on the “balance” of our shell. This gives us all the idea that we are supposed to balance the boat by this movement of our hands and the chase is on! **Rather, the lesson should be that it is these very movements which destabilize the boat.** It is symmetry of movement which creates stability.

In the end, I suppose that it does come down to balance, but this must be within the context of stability.

Constant Pressure against the pin: this is one of the “core” ideas of the Nutshell. Use your triceps, forearms, outsides of your hands, pecs, your core, **all transferred into the pins through stable elbows;** but not YOUR THUMBS! Your thumbs are not designed for this type of work. They rest on the face of the handle to let you know where the end of the oar is. This pressure is always applied in the specific vector toward the blade. Many of us learned to row with the idea of applying “Lateral Pressure”. We are now simply taking that notion a bit further, and taking it much more seriously. It means that at the release you are pressing toward the blades off the stern, mid-recovery, the vector is more “lateral” and at the entry it is toward the direction of the blades in the bow. As you move through the drive, the force vector shifts with the blade’s position. **The stroke is never two dimensional, never ergometer rowing.** We are not concerned with bringing or “pulling” the handles anywhere. We are always working in three dimensions, always working against the pins applying pressure toward the blades. At first, when just learning to really take this seriously, you must exaggerate this notion. You will come in off the water with sore, tired triceps and perhaps pectoral muscles. You will say to yourself, “This cannot be right”. And, you will be correct. Ultimately we do

not want to be wasting all that energy. There is a difference between leaning against a wall and trying to push your hands through the plaster and simply resting your weight against it, such that if you remove your hand, you will fall over. Ultimately, that is all you need; however, if you begin with such finesse, you will never learn when you are truly applying the type of pressure in the direction of the blade that we want. Push your hand right through the wall at first, or as Fairbairn put it, try to push the button through the oarlock.

It is enormously useful to picture this three dimensional movement, this specific force vector toward the blade, first toward the stern, then more perpendicular and then towards the bow, in your mind's eye while on the recovery (and Drive). Picture the changes in the direction of this force as you move through the recovery while rowing. **Mentally embrace this idea while performing it.**

Suggested Drills:

- 1) Pause drills for symmetry of hands and preparation, and for reinforcing the difference between the first half of the recovery and the second half leading into the entry.
- 2) "Skimming" for the movement into the stern without using your legs to draw yourself forward. Relaxing the legs and keeping the hands separating while applying constant pressure against the pins in the direction of the blades.
- 3) "Swans" to learn the proper rotation of the pelvis for correct body angle and posture.

3. The Entry (There is no Catch)

The Entry is the very last element of the recovery. It is very subtle and quiet. First, I think that the very word, “catch” gives the totally wrong impression. This is water we are talking about. **You cannot catch it!** Your goal is to let the water accept the blade, to work with the water, not against it. (another “core” idea of the Nutshell).

In keeping with the idea of always applying pressure on the pin in the direction of the blade, do not make the entry by thinking of swinging the hands “up and away”. This will pull you off the pin, however slightly, and cause you to be unstable at a critical time. By opening the angle of your armpits while continuing to push back towards the blade against the pins through the elbows with very “soft” hands” feel as though you are almost throwing the blades into the water. Be sure, however, not to lose the pins while doing this. Keep your elbows working into the pins. If your legs are relaxed and your core firm and steady, the process of “pushing” out and back against the pins will propel you and your seat toward the stern. You will be setting the blade into the water while clearly moving into the stern.

With your sternum up, feel as though you are pushing your back through your chest and shoulders while keeping your shoulders down and pushing against the pins. As the arms continue to separate and the chest open, squeeze your shoulder blades together. (Open your chest and close your back) In other words, use your core muscles through the elbows to make the entry. This allows you to keep your hands soft and legs relaxed. Do not pull yourself towards it with your feet or legs, nor pull the boat towards you. Let the entry come to you. The distance between the handles should continue to separate, as it has been since completion of the “reach phase” on the recovery. The separation of the handles up to and, actually, past the point

of immersion of the blade is absolutely critical. Keeping your sternum up, feel as though you are expanding or opening your chest as you slice the blade into the water. It is important to make the entry with as little turbulence as possible. Do not announce the entry. Allow the water to accept the blade. If we are soft and patient, **once the blade is half buried, the water will grab it and pull it in.** The sound will be very different (as will the feel) for this entry. **It will sound like a pebble dropping into a pond, a kiss almost, not a smack.** This is a gross motor operation involving much larger muscles than simply thinking of using our hands. Our hands are way too clever. They do things we do not intend; one may dominate, dip, rise, clutch or grab. They can move at different speeds. Keep this gross and simple, allowing the hands to be light and relaxed. Do not think of catching anything! We are keeping our pressure against the pins by using our rhomboids through the elbows to push backwards towards the blades and our core muscles to stabilize ourselves and separate the handles through the entry. While it is important to respect the geometry and physics of the stroke cycle and the movement of the boat through the water at all phases of the stroke, no time is as vital as this ever so brief moment of the entry.

If we look at a velocity curve of our shell during the recovery, we see a rapid deceleration of the speed of the shell just before the entry. This deceleration is far greater than any acceleration during the drive and continues past the point of immersion of the blade.

Our actions here have an enormous impact on the speed of the boat. Tension in our legs and roughness in our hands or movements will seriously interfere with our ability to **feel**

and work with the speed of the boat and therefore to keep constant pressure against the pins and thereby to match our speed with that of the boat, diminishing our ability to become one with the boat **IN MOVEMENT. Movements should be quick but not sudden. The shell does not respond to SUDDEN**

It is not important when you square the blades. The only important thing is that the blades enter fully squared and not be rowed in. While it is true that if your grip is loose, the water can set even an under squared blade, this will not work very well if you allow for the kind of patience before the drive that we want.

Square the blade as the circumstances and your skill require. If rowing in rough water, keep on the feather a bit longer. If a following breeze, stay squared a bit longer

Here it is necessary for a brief discussion of this geometry and physics. First the geometry. When the blade enters the water, there is a brief moment, ever so brief yet so significant, when the blade is actually moving, slicing, toward the “finish line” along with you and the boat before the tip of the blade begins to swing toward the “starting line”. Simply put, the blade transcribes an arch. It does not immediately begin moving toward the starting line or stern of the boat. This is important to keep in mind and has importance regarding the continued deceleration of the shell and the manner or degree to which the water accepts the blade.

Now very briefly, and certainly over-simply, the physics. The blade of the oar acts as a hydrofoil, as a wing. This gives us lift. The laminar flow sucks the blade and hence our shell forward. This is why it is so important to have as little turbulence on the back of the blade as possible. In order to take full advantage of this moment of propulsion, of

being sucked forward (thereby diminishing the deceleration of the boat), it is necessary to continue to lightly keep pressure against the water pressure on the back of the blade. Failure to do this greatly diminishes this effect. Any attempt to apply immediate or “instantaneous” pressure against the foot stretcher as the blade touches the water and spring “simultaneously” toward the bow (as we have so often heard) will be disastrous to the run of the boat because it denies both the geometry and the physics.

This period of time, until the blade begins to swing toward the stern and while we are working with the pressure on the back of the blade is very brief, about as long as the snap of your fingers. To the rower it should feel like “**Dead Time**”, almost unthinkable under all our past models of “the catch”. However, we are occupying this time by **holding our pressure against the pins**, allowing the water to firmly grab our blades which pulls the handles into our finger tips and us, however slightly, into the stern. **Of course, this requires enormous patience, relaxed legs and soft hands.**

The effect on the blade and our boat during this “Dead Time” is similar to the effect of water on the hands during the crawl and breaststroke of a swimmer. For example, if we look at the crawl stroke, the hand slices into the water trying for as little turbulence as possible. **This entry is made short of full arm extension, or reach**, and then the hand extends out to full reach **under the water moving against the stream** or flow. As with our rowing entry, the hand acts as a foil and the quicker movement of the water over the back of the hand than across the palm gives us “lift”. The water actually pulls us forward. This is even more dramatic when we look at a breaststroker who gets pulled up and forward as the hands thrust forward against the flow

of the water.. Just as in our swimming stroke, we can think of achieving our full length when the blade is in the water. The only difference is the amount of this “Dead Time” which is much shorter for rowing than for swimming. Our recognizing this is the difference, however, of working with the water rather than against it, and having our blades locked on much earlier which increases the effective length of our stroke significantly. This application of light pressure against the flow of the water seems counter-intuitive to an oarsman, who feels this must be stopping the boat; however, it is not counter-intuitive to a swimmer nor to a fish. Think of a fish swimming upstream by it's gentle undulation as it applies pressure against the flow of the water.

It is very important to remember that at the entry and just after the immersion of the blade, the blade, along with you and the boat, of course, is moving toward the finish line and that, therefore, your pressure against the pin should be in the direction that the blade is moving. Do not use the hands for this, use your core against the pins.

Suggested Drills:

- 1) Newtons
- 2) Skimming
- 3) Front End. Esp. in a team boat when others can set the boat

4. The Drive

Once the blade has started to swing toward the stern of the boat caused by the movement of the boat forward and the handles have, therefore, started to come back toward you, after this brief “Dead Time”, and we have begun to work with

the water rather than against it, the pressure switches to the face of the blade and we are in familiar territory. Drive off the pad of your big toe against the foot stretcher (against the pins) and suspend your weight over the handles. Allow the handles to follow your **center of gravity**. If our entry has been soft, the blades will sit at the correct depth. As soon as you have begun to press against the foot stretcher, snap your heels down onto the base of the foot plate. Do not gradually roll them down during the drive. Getting them down quickly stabilizes the boat and gives you better suspension, a solid platform from which to suspend your weight and open your back. At this point, you should still be pushing the button against the pin towards the bow and keeping your elbows working into the pins, keeping the same awareness of your relationship to the pin as you had on the recovery. Keep your “sparrow hold” of the handles. (see “Grip/Feathering”) . **No power is generated from the hands!** Do not be concerned with bringing the handles towards you, or anywhere for that matter.

Once you become the active agent, i.e. on the drive **as soon as the handles have started to come toward you**, it is important to hold a firm abdominal/core muscular contraction all the way through to the release. While constantly driving your knees away from your body (not prying your body away from your legs) the handles should travel in a direct line from the point of entry, following your center of gravity, to a point somewhere just below the lower tip of your sternum (center of gravity) at the finish of the drive. Again, never lose the pressure of the button against the pin applied **Toward the Blade**. While your back should begin to “Open” just after the engaging of your legs and hips, (I use the snapping down of the heels as an indicator of the time to open up, when you have a very solid platform)

think of the middle third of the drive as the maximum power application and body swing. It is then when your whole body is actively engaged in working against the pins. When you **feel your body weight begin to settle onto the seat** (before it has settled), somewhere in the last part of “the middle third” begin the **Arm Draw** and thereby continue the suspension. **When the elbows begin to break, be aware of applying pressure through them toward the pins, toward the blade.** At this point of the drive, your upper body is the match for the strength of your legs which lose mechanical advantage as they approach becoming straight (think of trying to do a leg press beginning with the legs nearly straight) and can hold your suspension. This is an issue of feel! The point and manner in which your arms begin to draw, joining the legs and back, is extremely important. It should not be jerky. If the front end (entry and beginning of the drive) has been effective and the middle third powerful, **the arms will not be able to add anything** but rather just be able to hang on and continue the suspension. Again, looking at a velocity curve of a single stroke we see that the speed of the shell begins to level off during the last part of the drive. Any effort to increase the speed (sometimes referred to as “accelerating into the finish”) at this time will be a serious waste of energy. **The boat simply will not “accelerate”**, that is speed up. All you will do is stop working with the water and begin to rip your blades through the water, lose stability and mess up the proper release point. Once again, this is a question of feel, of feel for the pressure against the pin, against the foot stretcher, of water on the blade and the general movement of the boat. If you are focusing on applying constant pressure against the pin in the direction of the blade, this will become second nature, not mechanical!

The **Power Clean** is the model we use for the power application of the drive in that it begins with pressure against the floor (our foot plate). Once the hips have engaged and the bar has come up off the floor, the bar is aggressively accelerated by a powerful thrust of the hips. This “middle third” is the main thrust of the lift/drive. For the very last part of the drive (Finish??) feel as though you are pulling your back through your shoulders and elbows against the pins without “bucking or lugging” into a position of intense stability. Legs, back and arms should finish as close to the same time as possible. **Learn the lesson of rowing with your feet out!**

The feeling is of **Drive/Release, not Drive/”Finish”/Release.**

Push the blades out of the water when still “**Loaded**” with the feet, just as the backs of your legs hit the seat deck. Do not pull them out with your hands or arms! Drive, Release, drive release. Just let it go!

Just as at the entry/front end of the drive, when you are in front of (through) the pin and therefore pushing the button toward the bow, at the end of the drive/back end, you must continue pushing the button onto the pin toward the stern. This is done by pushing through your elbows, while still drawing the handles toward you. In a sweep stroke the inside hand pushed the button against the pin toward the blade while the outside arm continues to draw the handles toward the bow, in a sculling boat we have two inside arms at the back end.

There should be no feeling of violence during the entire stroke! If you have made a sure, patient entry, allowing the water to accept the blades (there is no catch) while paying attention to the feeling of the water against the back of the blade for that snap of a moment of “Dead Time”

which is actually occupied by yourself being pulled, however minutely, into the stern by continuing to separate the handles in your effort to keep constant pressure against the pin toward the blade (**soft hands and relaxed legs are absolutely essential here**) and allowing the water to pull the blade and then feeling the pressure shift to the face of the blade, the entire process should be swift, silky smoothness.

When the backs of the knees hit the seat deck, keeping your vertical orientation and trunk still, brace the legs and using the forearms hinged at the elbows while making yourself a **Fortress of Stability** tap the oars out, release the Frisbee and make your consistent symmetrical pattern.....

Suggested Drills:

- 1) Feet Out
- 2) Blending the Drive
- 3) Front End

5. Breathing

While it seems almost ludicrous to even mention that breathing is extremely important for the supply of oxygen to your muscles and for the removal of CO₂ from the lungs, it is an element of the stroke that is often overlooked. It is also very important for establishing and sustaining **your rhythm and stability**. The basic pattern should be to inhale at the entry, hold your breath during the drive and exhale at the release. This exhale should be forceful. This is important because while your muscles make their need for oxygen more than apparent and your body naturally responds to this need by sucking in oxygen, there is no internal mechanism which tells you to get rid of the resulting build-up, way

beyond normal, of CO_2 in your lungs. This build-up can cause the sensation of being short of breath, because there becomes less and less room in your lungs for fresh oxygen. Furthermore, the exchange of oxygen into the bloodstream is much more efficient in the lower regions of the lungs. You should take special care to exhale as much CO_2 as possible. Now, of course, we do not want you to be holding your breath during the recovery, so a simple inhale followed by an exhale leading up to the main inhale at the entry and then forceful exhale at the release is suggested. This will occur naturally if you simply think of not holding your breath during the recovery. This should become your pattern no matter how hard you are rowing, from steady state, when the demands are not so great, to sprinting, and paddling. You want to establish a pattern that will meet all your needs from practice to racing, sprinting to head racing so that you will not be forced to make a change in your pattern, nor think about it. Physicians will tell us that it is dangerous to hold your breath during extreme or maximum exertion; however, no individual stroke approaches this type of maximal effort.

One of the unfortunate consequences of exhaling at the release is that this process of exhaling, i.e. the depression of the diaphragm which compresses the lungs and therefore forces CO_2 up and out, tends to make one collapse at a time when we want to be a Fortress of Stability. However, there is a nice pilates/yoga exercise which corrects this. Rather than thinking about the diaphragm depressing, think of following the breath. As the lungs depress, expand your rib cage as the CO_2 passes up and out. This helps you to sit up and keep our vertical orientation with our weight above the handles.

6. Rhythm

Breathing is, as I mentioned, very important in establishing our rhythm. It centers you and your boat into a consistent cycle. After the forceful exhale at the release and the rotation of the pelvis as you swing your body forward over your knees and your hands away, it is time to relax and rest! If your release has been made at the correct point (just as the backs of the legs have hit the seat deck) the blades will have left out of the water and changed direction almost effortlessly. This happens extremely quickly and many people forget to relax at this point. This will be particularly true if you have been accustomed to making the release too late. If this has been your habit, you will be accustomed to rest just after you have “wrestled” the blades out of the water. This resting at the release interrupts the release of the energy which has been stored in the oars and forces you to waste your own energy and begin the stroke cycle all over again rather than letting it seamlessly develop. It is this sense of flow which creates the wonderful feeling of ease and rhythm we are after. Many coaches speak of the importance of “ratio” during the recovery. What they are really after is this sense of flow. If a boat is moving with this sense of flow, the perception is that the recovery is taking twice or even three times that of the drive; while the reality is that when racing at full speed the ratio is much closer to one to one. This feeling of flow begins, I believe, by the effortless extraction of the blade and seamless change of direction of the oar handle while keeping continuous pressure against the pins. In keeping with this idea, the hands should swing away naturally following the speed of the boat. Once this is accomplished and the body has swung over, REST and relax the legs. **The sense of ease continues with the sense that the seat**

and handles are traveling at the same speed as the boat, that the next stroke is coming to you, creating this sense of stillness as you flow into the entry moving with the speed of the boat. This ease continues as the recovery seamlessly blends through the entry into the drive, which continues through the consistent pressure against the pins into the smooth blending of the arms with the legs and back. All this is held together by consistent pressure against the pin and our contact with the shell through the seat and feet and by a rhythmic breathing pattern.

7. Erging

Often, technique goes out the window as soon as butt meets seat. Some people take more strokes on an ergometer than they do on the water. It is important that you try to reinforce proper technique such as you can in a two dimensional world without a pin.

On the drive, the chain must travel in a linear path leaving the sprocket until the finish of the drive, straight through your center of gravity.

“Release” with your trunk firm and still. The hands then travel parallel to your belly (without touching it at the end of the drive) and then parallel to your thighs until past your knees and then parallel to the floor. From there until the “catch” they remain at the same height. As in rowing on the water, you should have completed your body angle with your arms fully extended by 1/2 slide. During the second half of the recovery, your hands and seat should be traveling at the same speed. Keep your seat moving at a constant speed.

The ergometer is an excellent tool for working on your body preparation and handle pattern as well as breathing.

8. Grip/Feathering

As far as I can tell, every aspect of the rowing stroke, sweep or sculling, has some similar movement in the “real world” which replicates the rowing movements....except feathering. If we hold up our hand , palms away, and count our knuckles from the tips of our fingers, we have our first knuckles, second knuckles, and then closest to our palms our third knuckles. The process of feathering is actually quite simple. Keeping the wrist flat, with the fingers curled as though holding an oar (that is with the finger tips pointing toward the floor), raise the second knuckles and depress the third. To square the blade, simply lower the second knuckles. It helps a lot if you have handles that are neither too big nor too small.

In order to do this without breaking or bending the wrist, however, you must have the correct grip. With your wrists flat, arms extended and the blades squared, hold the handles so that the third knuckles are on the center line of the top of the handles or just aft (toward you) If these third knuckles are toward the stern of the mid line, thereby having the handles somewhat in your palms, when you attempt to lower the third knuckles, your wrists will break downward because the pads under the third knuckles will not be able to roll the handle without this breaking. Overall, your grip should be just firm enough to hold your sparrow without injuring it(see Recovery). The only function of the thumb in this is to let you know where the end/face of the handle is. Do not make too much of the command to keep the handle out in the finger tips. You cannot control the handle if it is too far toward your fingertips.

9. Center of Gravity

An easy way to tell about where your center of gravity is is by imagining that you are in a one-on-one rope pull, tug of war. Stand with your feet planted and imagine that you are taking hold of the rope, exactly where you want it. Most likely, you have found your center of gravity. **It is very important to have your oarlocks' height set correctly so that when the blades are just buried with no shaft in the water, your handles are at your center of gravity.** If your handles are too high when the blade is buried, you will struggle with your shoulders to hold on to this proper depth but not be able to. The handle will want to seek out your center of gravity and begin a downward path which you will not be strong enough to rectify once it passes through there on it's way into your lap and you will wash out.

10. Starts

We use a basic five stroke sequence for our racing start. Each stroke has a specific purpose.

First Stroke: this is different from every other stroke you take. It's purpose is simply to overcome inertia and get the boat moving as cleanly as possible. Sitting at 3/4 slide, as tall as you can be, hands and fingers loose and relaxed, begin the first stroke by opening your back, then add the arms and have the legs join in and push through the drive. Beginning the stroke with strong legs first as we do every other stroke will absolutely push the boat backwards. Don't try to travel the length of the race course on the first stroke, just pry the boat away. Be sure not to cut

this stroke short at the back end in an effort to get the rating up. That is the purpose of the

Second Stroke: this is very short, 1/2 slide. It's purpose is to get the rating up. It feels as though the knees hardly break as you come forward. There is absolutely no need to hurry this. The rating comes up because the stroke is so short. Be patient. **Allow the stroke to come to you.**

Third Stroke: the purpose of this stroke is to begin to get your length. We come up now to 3/4 slide. Stay relaxed and begin to lengthen out.

Fourth Stroke: continues the purpose of the third, lengthening to 7/8ths of full slide.

Fifth Stroke: by this stroke, we want to be at full slide.

Starting from a stake boat in a current: as of now, the starting commands are (with or without a countdown), "attention...go". Normally you would have your blades squared before the "attention"; however, if you are in a river with a current, you must delay squaring until "attention" as squaring before that will cause your boat to be pulled around, off the stake boat, or some other disaster. Which brings up another important point about racing....**be prepared and expect something to go wrong!** You may be late to the starting line and not get in your planned warm-up, clash oars, crab, forget your speed computer.....

11. Most basic Rigging

There are numerous good books on rigging, so I am only going to mention two issues: **oarlock height and foot stretcher placement.**

Oarlock height needs to be set, as mentioned in #9 “Center of Gravity”. This is absolutely essential for proper application of power and your ability to suspend your weight while keeping your blades at the proper depth.

Foot stretcher placement has everything to do with the proper release point and your ability to get out of the water cleanly. From a line through the pins out perpendicular to the shell, the angle of the oar at the release will be very roughly somewhere between 35 and 40 degrees.

An important factor is the position of your hands relative to your body at the finish of the drive when the legs are flat. **The rule of thumbs:** with your legs flat, sitting at the back end of the drive with your normal, comfortable lay back, set your stretchers so that when your handles are a fist width apart, your handles are a thumb’s distance from your body. This is a very general place to start and I have found that when people begin to learn where the proper release point is, that we can move the stretchers more toward the stern, through the pin. Basically, you need to have your hands close enough to your body to feel stable at the release.

You should also try to set your stretchers so that you can have the swivel point of your hips about as far through the pins as your boat will allow without your shins coming quite to perpendicular. It used to be that perpendicular shins was considered “optimal”; however, I think this is too much compression and unnecessary as we get our length through separation of the handles not so much through leg compression. Set your distance through the pin first and then work on the release angle. There are a number of factors here including span and inboard and oar length. Basically, at the finish of the drive, you do not want to be

traveling so far into the bow of your boat that your blade loses the little hollow/vortex which forms behind the blade, nor do you want to have the blade travel into “new water” as it moves toward the hull and loses the water that has been stacking on the face of the blade. You can observe this from your position as you row. The blade wants to be released when the legs are just flat and it is still “loaded”, without losing the vortex and moving into new water which will cause your blade to get stuck. Foot stretcher placement will take some trial and error.

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