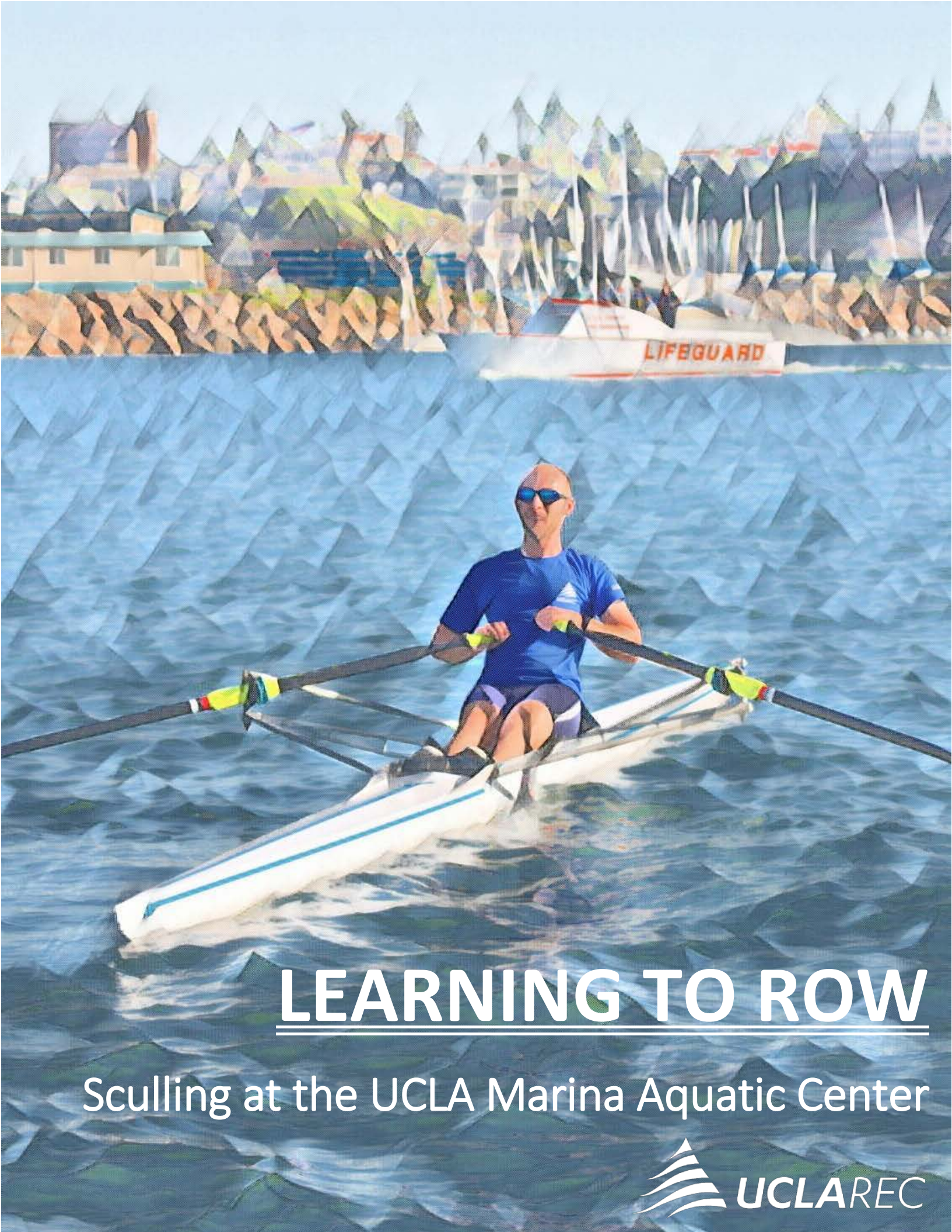

LEARNING TO ROW

Sculling at the UCLA Marina Aquatic Center

UCLAREC

LEARNING TO ROW

Sculling at the UCLA Marina Aquatic Center

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UCLAREC MARINA AQUATIC CENTER

SECTION 1: THE ROWING STROKE

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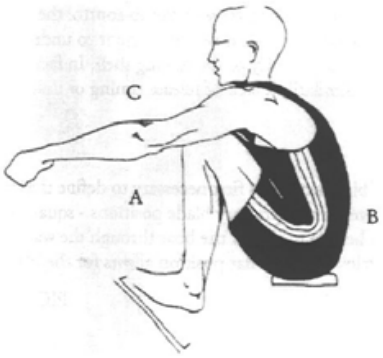

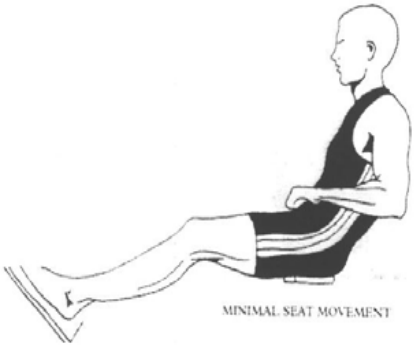

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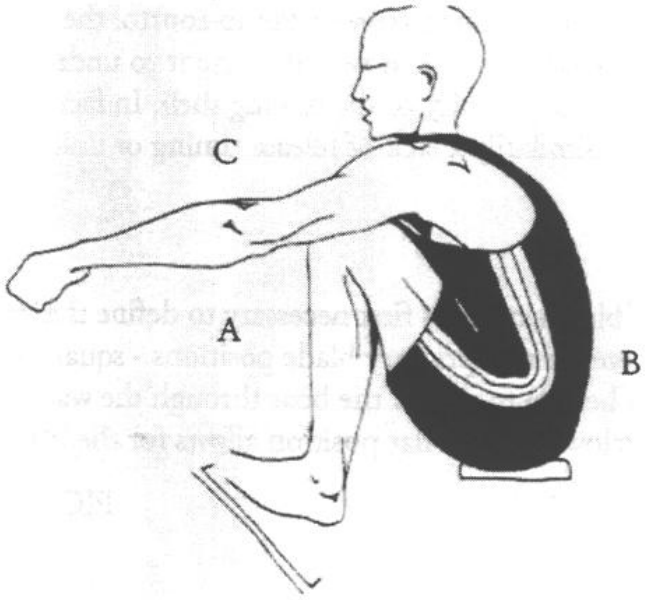
THE CATCH



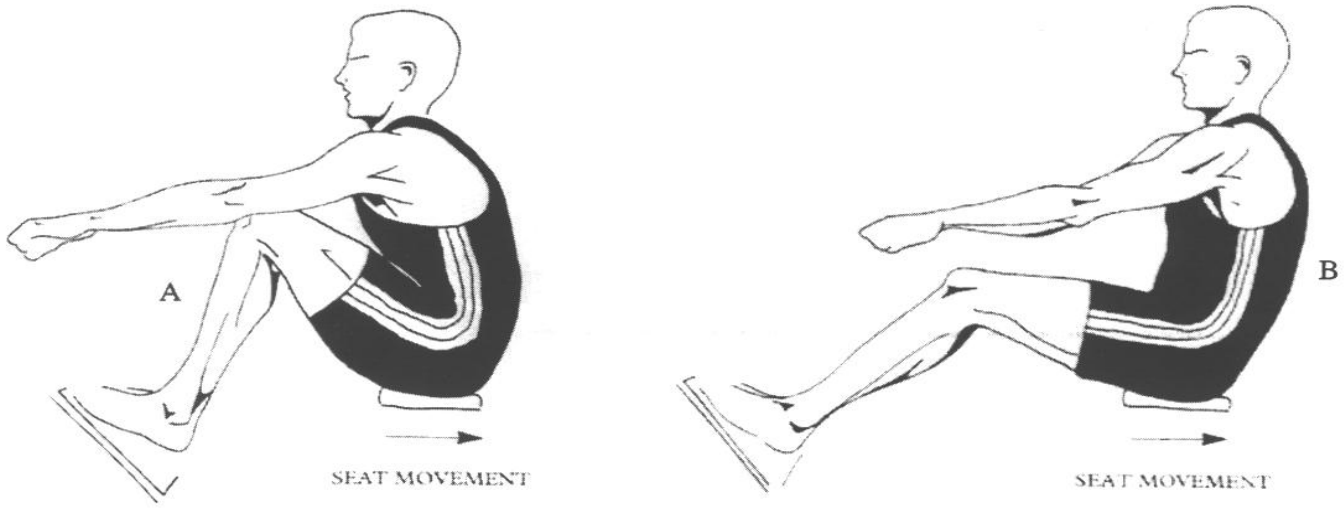
The Catch
The Catch is the point at which the blades are inserted into the water.

The Catch Body Position
The legs are held with the shins at a 90-degree angle relative to the boat (A), a position known as full slide. In this position the heels will naturally lift off the footplate of the stretcher. The back is held straight and leaning forward with the shoulders relaxed (B). It is important that the forward body angle at the catch be obtained from the hips and not from the lower back. Each hand should hold an oar while the thumbs are pressed against the ends of the grips to keep the oars in the oarlock. The arms should be fully extended with the knuckles, wrists, and elbows forming a straight line (C). The body should remain centered over the long axis of the boat, as all motion will occur along this line. The arms will follow the arcs of the oars around at the catch while the body remains centered.

Once the body is in the position described above, the blades are inserted into the water. This motion completes the slide forward and begins the pulling and is accomplished when the rower exerts upward pressure on the oar handles placing the already squared blades into the water. It is important to remember that the rowing stroke is a cycle of motion, and there should be no stopping between the end of the recovery, the catch motion, and the beginning of the drive.

The Catch Blade Position
The blade is held square as it enters the water. It is important to prepare for the catch by squaring the blades before reaching full compression with the legs, the catch position described above. The hands should be lifted as the seat nears the frontstops so that the blades enter the water still traveling toward the bow of the shell. It is important that the continuity of the stroke be maintained with an early entry of the blades into the water.

THE DRIVE



The Drive

The Drive is the work portion of the rowing stroke, when the blades are in the water and the rower is pulling on the handles.

The Drive Body Positions

The drive may be divided into three parts based on the dominant muscle group used during each portion. The order of these parts, or the sequence of muscle groups used, is determined by the relative strength or potential power of each. By employing the parts of the body in the order outlined below, the rower is able to continuously accelerate the oars throughout the stroke. When sculling, all motion during the drive should occur along the long axis of the boat, with all body movement synchronized. Outlined below are the three parts of the drive in the order that they should occur.

1. Leg Drive
2. Back Swing
3. Arm Draw (continued on next page)

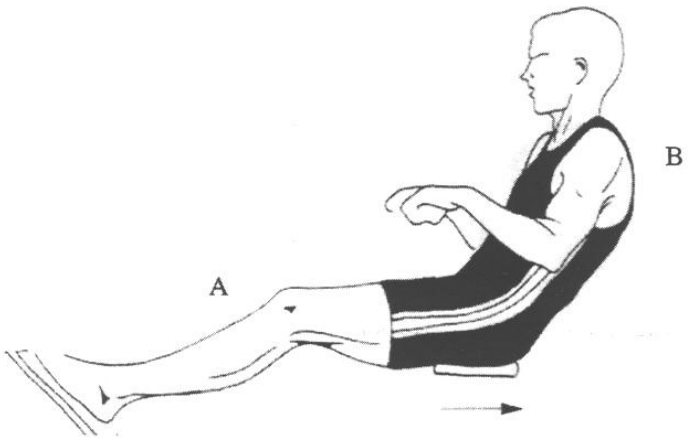
<u>The Leg Drive:</u>

The leg drive begins as the blade enters the water at the catch (see The Catch), with the shins at a 90-degree angle relative to the seat deck, arms fully extended, back straight and leaning forward, and the chin level. The legs initiate the stroke when the blades enter the water, with the back staying in its original angle until the legs are about halfway extended (A). To maximize the propulsive force of the leg drive the back should be held firm and not allowed to open until the legs have completed half of their extension.

<u>The Back Swing:</u>

With the legs continuing their extension the body begins to swing toward the bow of the boat. This opens the body angle through the upright position (B), adding the body weight to the power of the legs. The back swing is empowered by the fact that as the back begins to move, the oars are at or around a 90-degreee angle to the boat, a position, which physics dictates as the point at which maximum leverage, is possible.

THE DRIVE (CONT.)



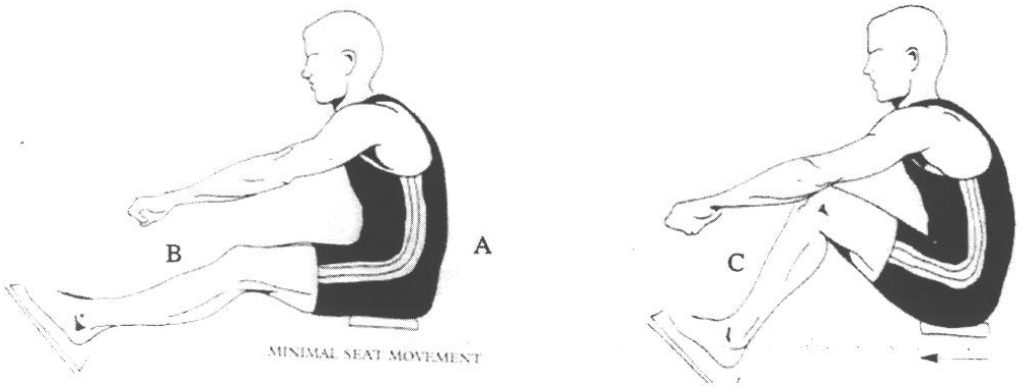
The Arm Draw:

The final portion of the drive, the arm draw, begins as the back swings through perpendicular. It is important to wait until this point, as an earlier use of the arms will result in a diminished capacity for acceleration. The arms should draw the oar handles towards the chest as the legs maintain their pressure against the footboards (A). As the oars near the body, the shoulders should be relaxed, the back straight, and the wrists as flat as possible (B). During the arm draw the handles will briefly overlap with the left hand leading and above the right. In sculling, as previously mentioned, the hands and arms should follow the arcs of the oars. Thus, at the finish, the hands are drawn toward the outside of the lower chest in arcs termination at the rib cage.

The Drive Blade Positions

The blades remain square throughout the drive. It is important to keep the blades at the surface of the water by ensuring the hands travel in a level path back to the lower chest. If the blades go too deep they will become unstable and the effectiveness of the drive will be compromised. This is known as "going deep." A similar lack of propulsion results when the hands are kept too low. This flaw in technique, explained in full later, is known as "washing out."

THE RECOVERY



The Recovery
The recovery is the time spent coming forward on the slide, following the release and preceding the catch.

Body Positions during the Recovery
The sequence of body motion during the recovery is opposite that of the drive. It is important to control these motions while keeping the body weight centered over the keel of the boat. Outlined below are the three parts of the recovery in the order that they should occur.

1. Arm Extension
2. Body Forward
3. Slide Forward

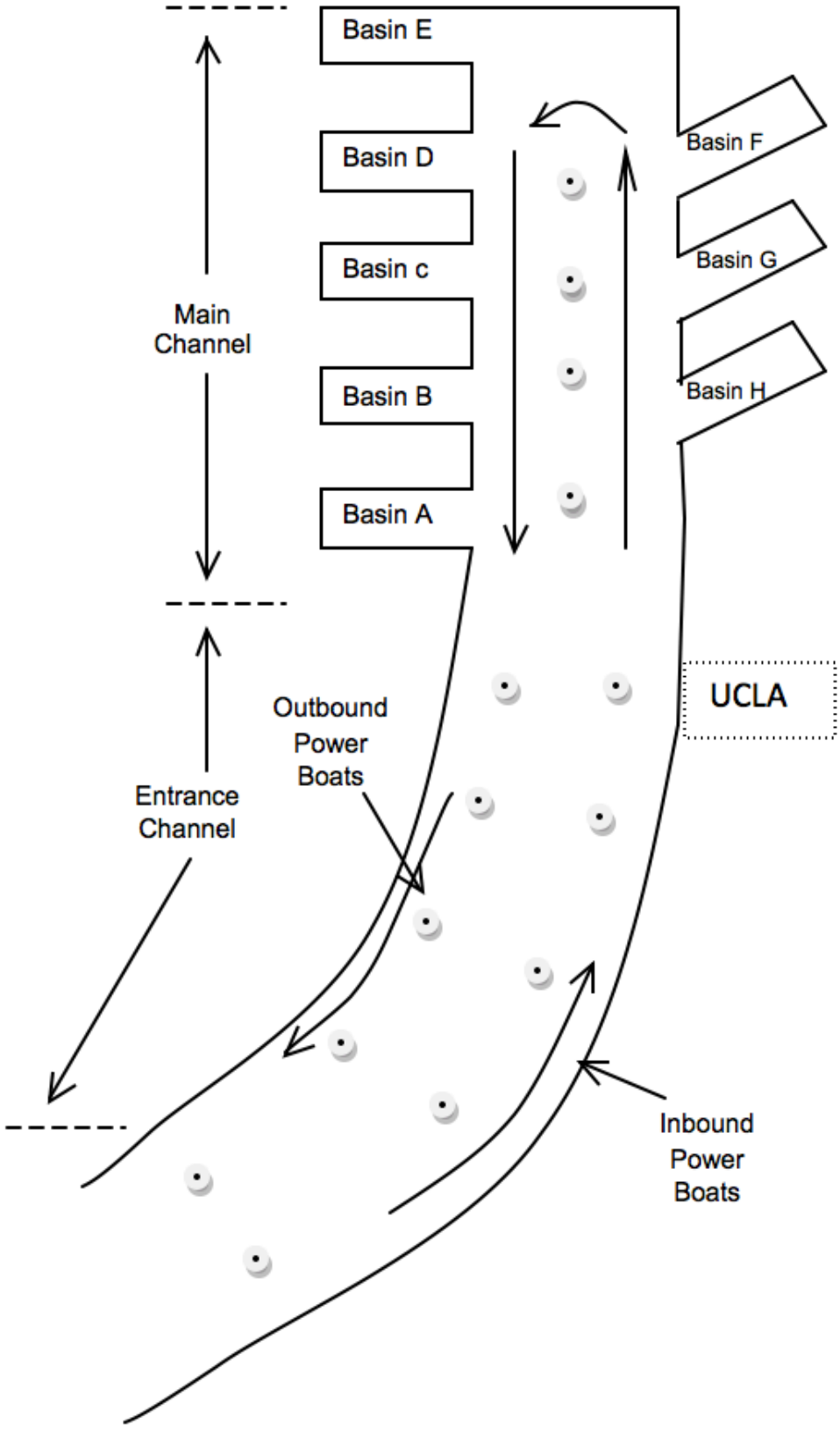
Arm Extension:
As the blade is feathered the hands are pushed away from the body while the back remains in place- acting as a platform to aid in the extension of the arms. A one to one ratio should be maintained with the handles traveling away from the body at the same speed they came towards it. It is important to not shove the handles away or move them too slowly, as each will disturb the continuity of the recovery. As the arms come away the handles will once again overlap with the left hand above and ahead of the right.

Body Forward:
When the arms near full extension the back should begin to pivot forward from the hips (A). This motion forward with the back should end as the handles near the shins (B).

Slide Forward:
As the pivot forward nears completion, the legs begin to draw the seat toward the frontstops (C). The knees should rise slowly until the shins reach 90 degrees. If the slide forward is not controlled, the momentum of the body weight will counteract the momentum of the boat forward, acting as a brake on forward progress during the recovery. This is known as “rushing the slide.”

The Recovery Blade Position
The blades should be kept in the feathered position for the recovery. During the recovery, the blades should be kept at a uniform distance off the water with small changes when necessary to affect to set or balance of the boat. As the legs near full compression, however, the blades should be squared to prepare for the catch. When the blades are fully squared upward pressure is exerted on the handles to begin the catch motion. The blades should begin their entry with the legs just short of full compression to ensure a smooth transition from recovery to catch to drive.

SECTION 2: NAVIGATION



MARINA DEL REY TRAFFIC PATTERN FOR SCULLERS

When rowing in Marina Del Rey, awareness is key to a safe and successful row. When rowing one must consider:

- The entire Marina and where you are in it
- Where you are relative to other boats in the Marina
- What you are doing in your own boat

MARINA TRAFFIC PATTERN AND BUOYS:

- From the UCLA dock toward the bottom of the Marina (by Basin E) is considered the "Main Channel".
    - The best place to row in the Main Channel is about halfway between the buoys and the docks. During the college season, sweep boats and coach boats will stay closer to the buoy line. Faster scullers will also be rowing closer to the buoys all year long. For novice rowers it is *extremely* important to follow this traffic pattern and to stay halfway between the buoys and the docks. If you row along the buoy line, you might wander into the wrong side of the Marina risking a head-on collision.
    - To prevent collisions with other boats exiting the basins, do not cut corners when you enter basins, especially E Basin. When exiting the basin, do not swing wide.
    - If you are returning to the UCLA dock from the area of Basin A, do not row on a diagonal from Basin A to the dock. Doing so will have you heading in the wrong direction when you get to the area of the UCLA dock. Instead, row into the Outbound Power Boat Channel to at least the first buoy, then go directly across the Marina to the Inbound Power Boat Channel and then to the dock.
- From the UCLA dock toward the break wall is considered the "Entrance Channel". The Inbound Power Channel runs along the south edge of the rocks and the Outbound Power Channel runs along the north edge. In-between the buoys is the Sailing channel.
    - If you want to start your row by going from the UCLA dock toward the ocean, check for boat traffic heading towards the Main Channel, then row directly across the Entrance Channel to the area of the Outbound Power Boat channel.
    - Rowing in the Power Boat Channels is somewhat similar to rowing in the Main Channel; stay halfway between the buoys and the rocks. During the college season, sweep boats and coach boats will stay closer to the buoy line as will faster scullers. Just be aware if you row too close to the rocks, you risk getting snagged in a fisherman's line.
- Boat traffic in Marina del Rey flows in a counter-clockwise direction.
    - If you are rowing from the UCLA dock towards Basin E, then the buoys should be on the port side of your boat (your right side) and the docks should be on the starboard side of your boat (your left side). Your orientation should be the same for rowing toward the UCLA dock from Basin E: buoys on the port side and docks on the starboard side.

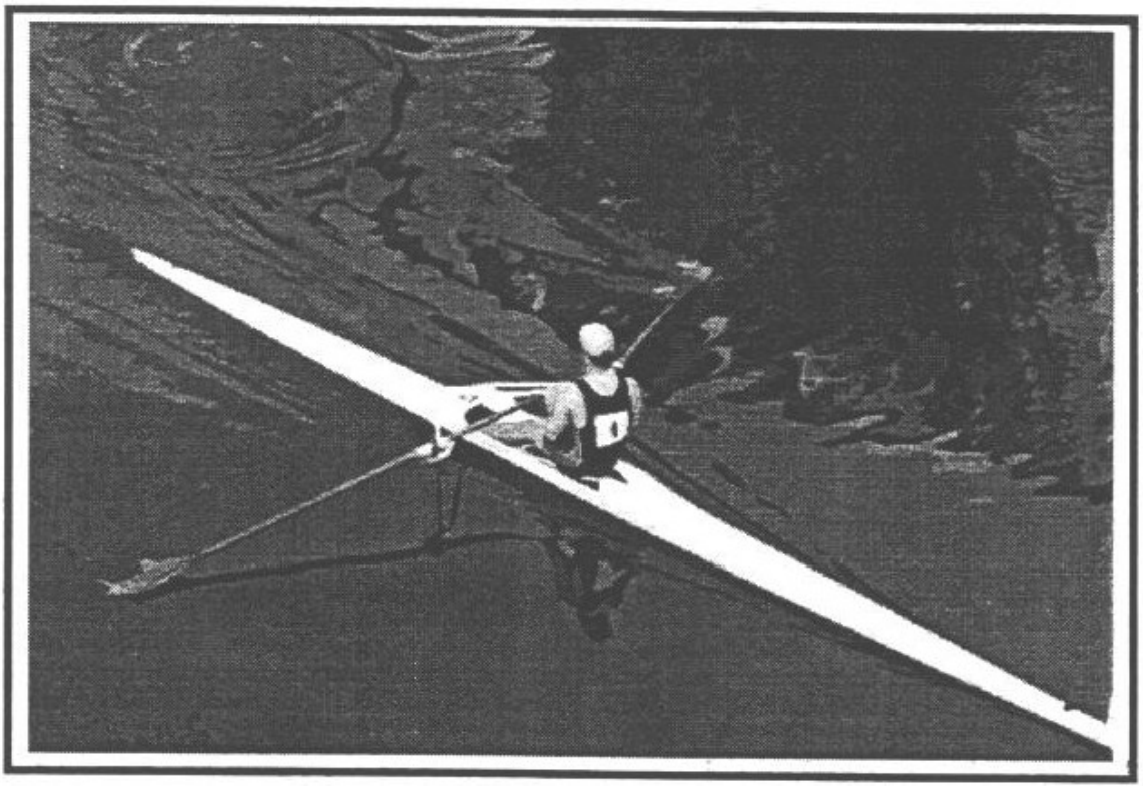
OTHER NAVIGATIONAL REMINDERS:

- Keep a constant lookout. Watch your course to your stern for overtaking vessels and to your bow for boats, buoys, and docks.
- Do not stop where you will impede others. Do not block traffic. If you must stop to receive instruction or adjust equipment, position your boat out of the main traffic flow.
- Give way to faster vessels.
- If another boat is overtaking you and you are unable to get out of its path, hail the rower to make sure that he sees you. Shout warnings early to prevent accident and near misses.
- Renters must stay inside the Marina, Main Channel, Entrance Channel, or E Basin. Renters may not row in the open ocean, or in Ballona Creek without special arrangements.

When you row, it's important that you know where you are and know where you're going.

Have fun and be safe out there!

SECTION 3: SCULLING



YOUR FIRST ROW

The following information, presented in list form, outlines the procedures required to row a single rowing shell. Note that this page is not designed to serve as blueprint for every outing but rather as a set of guidelines to help you enjoy your first rowing experiences.
Please pay close attention to the launching and dock procedures and always take caution when leaving or returning to the dock, as this is where most accidents happen.

WHAT TO WEAR AND BRING TO THE BOATHOUSE

1. Tight-fitting shorts or pants (anything baggy or loose may get caught in the wheels of the seat).
2. Close-toed shoes.
3. Sweatshirt or jacket.
4. Towel and change of clothes.
5. A strap or leash for your glasses.
6. Water bottle.

BEFORE YOU ROW

1. Jog or erg at an easy pace to prepare muscles for stretching.
2. Stretch (see section on stretching).
3. Check weather and/or rowing conditions.
4. Check-in with the dockmaster and sign out your boat.
5. Check dock for space availability.
6. Take oars down to dock.
7. Choose shell and carry down to dock with assistance from dockmaster.

RIGGING THE SINGLE ROWING SHELL

1. Open dockside oarlock and rotate so that oarlock points towards the stern of the shell.
2. Place dockside oar in oarlock and close gate.
3. Place hand or knee closest to the dock on top of rigger so that the boat cannot lean away from the dock.
4. While facing the stern place the knee or foot closest to the water between the tracks.
5. Carefully reach out and open waterside oarlock and rotate it towards the stern of the shell.
6. Without moving your feet or knew lift the oar and place in oarlock. Close the gate on oarlock.

GETTING INTO THE SINGLE ROWING SHELL

1. Extend waterside oar until the button of the oar rests against the oarlock.
2. Position body on bowside of rigger facing the stern.
3. Hold both grips with hand closest to the water. Lift handles so that blades are in contact with water.
4. Step into shell by placing both feet between tracks. It is important that you ONLY step on the area in between the tracks. This is the only part of the boat that can withstand your body weight. DO NOT step on the deck, on the footstretchers or on the bottom of the boat.
5. Sit down on seat.

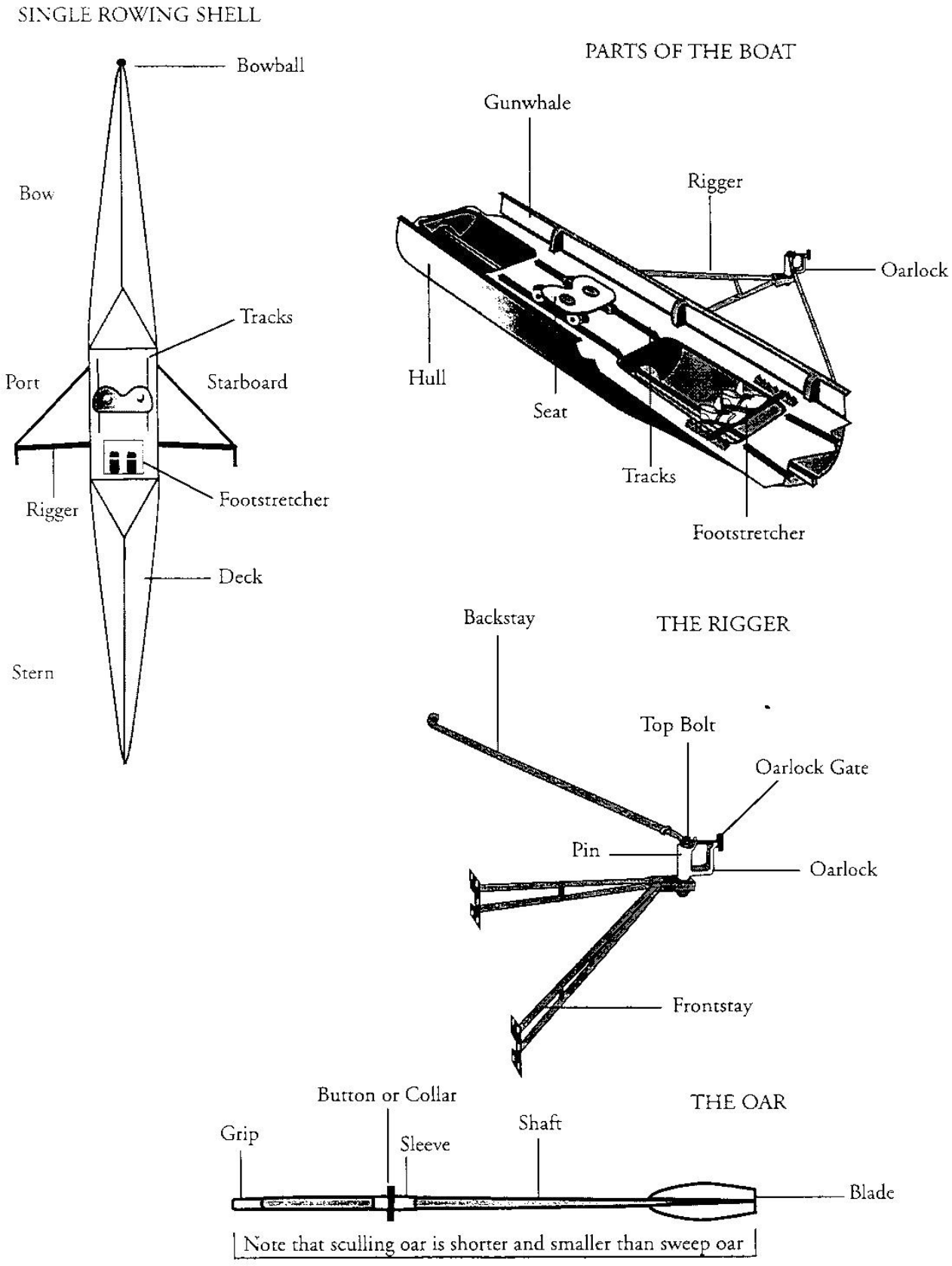
LAUNCHING FROM THE DOCK

1. Hold both oars with the hand closest to the water and push legs flat.
2. Lower hands and lean body away from dock so that oar and rigger do not drag.
3. Push away from dock with hand closest to the dock.

RETURNING TO THE DOCK

1. Approach the dock from the breakwater side of the marina. Your course should parallel the dock.
2. Within 25 yards of the dock reduce speed by rowing with the arms and back only. Begin looking behind you and adjusting course as necessary to approach dock.
3. Raise the oar closest to the dock off the water by pushing handles down and leaning away.
4. Maintain this position until close enough to grab the dock.

SCULLING EQUIPMENT



SCULLING: EQUIPMENT CARE AND HANDLING

OARS

1. Carry and place oars on the dock tips up.
2. Never stand oars against building.
3. Do not drag blades on the dock while docking or launching. Do not drag grips on the ground. The grips must stay off the ground at all times.
4. Rinse oars down thoroughly after each use, paying special attention to the sleeves, collars and oarlocks. When rinsing the oars, rest the oars in the boat slings with the blades on the ground and the grips off the ground.
5. When placing oars in rack do not stack the buttons on top of each other, as this will cause the oars to fall.

SHELLS

1. Lift the boat off the rack and walk slowly, keeping the boat level bow to stern and minding the riggers and skeg.
2. While carrying boats, dockmasters and users/renters are responsible for preventing riggers and/or boat from hitting other objects. Communicate with the individual you are carrying the boat with so that the equipment is not damaged.
3. When placing shell in water, users need to push boat away from the dock to ensure skeg is not damaged.
4. Scullers are responsible for holding the shell off the dock to prevent rubbing due to waves and/or wakes.
5. Always rinse and dry boat after a row on both sides, specifically all metal parts as these will easily rust.
6. Wipe your boat down with a towel after rowing, and remove hatch covers to facilitate drying.

ERGOMETERS

1. When using ergs outdoors, carefully wheel them out of the boathouse paying special attention to the surrounding areas (boats, oars, other ergs, etc.).
2. Wipe ergs down using a clean towel after workout including the rail, seat, and the handle.
3. Ergs should be properly stored after each use. Handles should be stored in the fully returned position against the cage to keep the resistance firm.

LIGHTS

1. All shells out before sunrise or after sunset must use lights.
2. Red and green lights are for bow and white lights are for stern.
3. Attach lights in boathouse not on the dock.
4. The dockmaster will provide lights to renters. They are color coded with tape to identify whom they belong to. Blue- UCLA Collegiate, Red- Juniors, Rental-Yellow

REPAIR

1. Boats in need of repair should be stored upright in slings and reported to dockmaster.
2. Users should not swap equipment between boats. Rowers should not adjust rigging or boats or oars at any time.
3. Rowers should check equipment before each row.
4. Give any broken equipment to dockmaster.

SLINGS

1. Rolling slings should be pushed to the sides of boathouse, out of the way of traffic.
2. When storing folding slings, ensure that fabric is not pinched or scissored between the arms of the sling.
3. When moving boats in rolling slings, always hold the boat and the sling.

BLADEWORK

Bladework is a term used to describe the actions a rower takes to control the movement of the oar during the stroke cycle. As a beginning or developing rower it is very important to understand and master bladework as it plays a large role in determining the speed and stability of the rowing shell. In fact, perhaps the single greatest deterrent to boat speed is a lack of catch timing. Similarly a lack of release timing or uniform blade height will play havoc with the stability of the boat.

BLADE POSITIONS

Before getting into the specifics of bladework it is first necessary to define the various blade positions and the hand positions used to obtain them. There are two primary blade positions - square and feathered. A squared blade is used during the drive (see diagram below) to propel the boat through the water. A feathered blade is employed during the recovery (see diagram below), and its flat position allows for the blade to rest on top of the water.

FIG. A: SQUARED BLADE

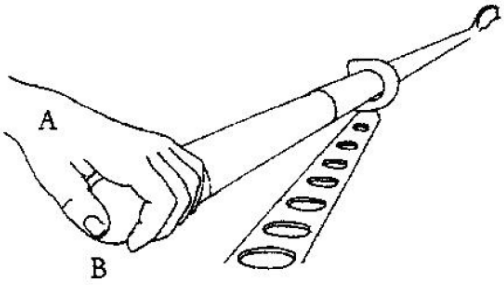
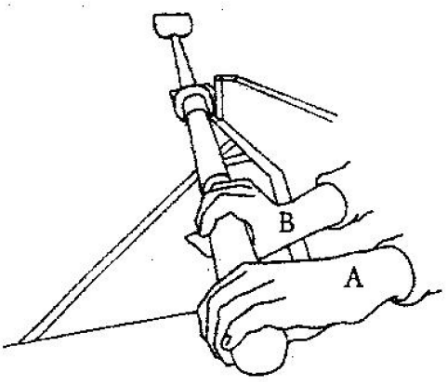


FIG. B: FEATHERED BLADE



HAND POSITIONS – SCULLING

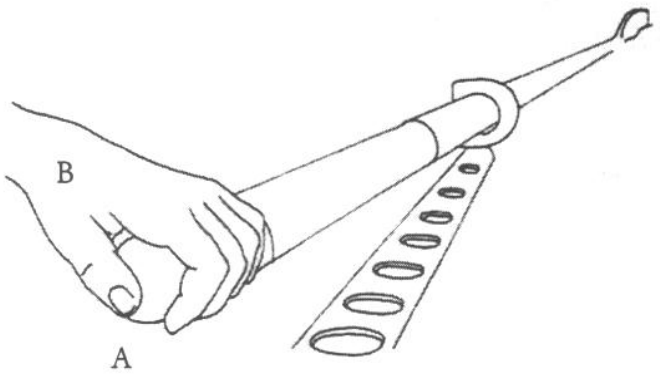
In sculling, as shown in figure A, the oars are held in both hands. When the blade is square and the oar is being pulled through the water, the hand should be positioned such that the wrists stay flat, with no flex in either direction (A). The oar handles should be gripped as loosely as possible with the hands acting like hooks to pull the oars, and the thumbs pressed against the ends of the grips to keep the oars from pulling out of the oarlocks (B). To maximize your leverage, keep the hands about 1-2 inches from the ends of the oars.

To change the oar to the feathered position, as you will do at the finish of each stroke, one gives a relaxed turn to the grip. Drop the wrist slightly while rolling the top of the grip towards the chest, while at the same time letting the grip roll out more under the fingers. To move the blade back to the squared position, squeeze the fingers toward the palm and rotate the wrist away from the body until it is flat.

SCULLING VS SWEEP: DIFFERENCES

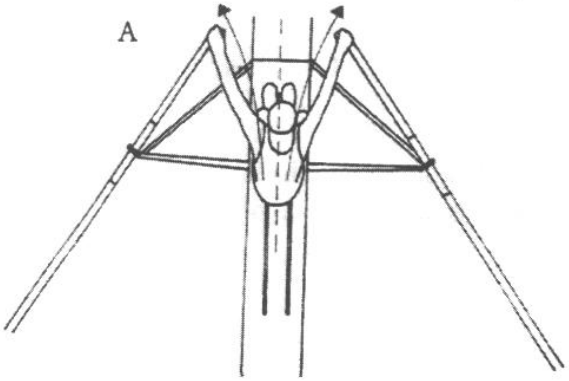
Although the fundamentals of sculling are quite similar to those of sweep rowing, it is possible to draw some important technical distinctions between the two disciplines. These differences, illustrated below, are centered around the fact that scullers must handle two oars while sweep rowers only one.

DIFFERENCE ONE: THE GRIP/BLADEWORK



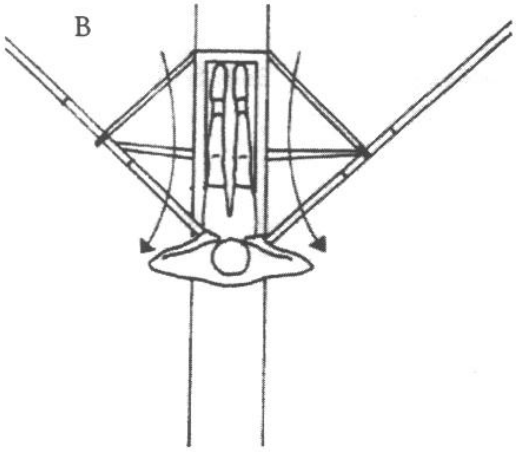
The handling of two oars simultaneously necessitates technique adaptations. Each hand holds an oar on the grip with the thumb pressed against the end of the oar to keep the button firmly pressed against the oarlock (A). When the blade is squared the wrists should be kept flat and the fingers relaxed (B). During the drive the hands should function like hooks, with care taken not to over grip the handles. The wrists are then pulled back to feather the blades.

DIFFERENCE TWO: THE ARC



In sweep rowing the rower moves his or her body within the arc of the oar, but in sculling the hands and arms are used to follow the arc. The body stays centered over the keel of the boat while the hands travel through the arcs. At the catch the hands come apart and travel out towards the gunwales again, before being stopped just in front of the rowers chest. It is important to remember that extra length is obtained when the oars are allowed to move further through their arc while the body remains centered.

Do not attempt to gain more length by using the body.



SCULLING: TECHNIQUE FAULTS

Below are some technical problems common to sculling as well as what drills can be done to address them. They are divided into the parts of the stroke that they occur.

THE CATCH

Fault	Symptom	Cause	Solution/Drill
Missing Water	Blades not in water as drive begins.	1. Blades not squared as drive begins. 2. Slow catch motion.	1. Rollup as handles pass over ankles. 2. Begin catch motion before end of recovery. 3. Balance Drills & Legs Only Drill
Blade Goes Deep	Blades buried well below surface.	1. Blades undersquared. 2. Catch motion performed with too much upper body motion. 3. Oar handles lifted too high at catch.	1. Practice squaring and feathering. 2. Do not lift upper body at catch, only outside hand is lifted. 3. Practice burying ½ of the blade. 4. ½ Leg Drive Drill
Blades Skying	Blades too high off the water at catch.	1. Handles are lowered before being raised. 2. Outside shoulder too low.	1. Row with oars on top of water.
Boat Unset	Boat leans to one side at catch.	1. Hands are not lifted together.	1. Legs Only Drill
Short Stroke	Rower never reaches full slide.	1. Apprehensive of reaching full slide where boat is least stable.	1. Shadow rowing with blades on top of water.

THE DRIVE

Slide Shooting	Seat moves faster than oar handles during leg drive.	1. Poor low back support.	1. Sit tall and support lower back. 2. Legs Only Drill
Early Backswing	Backswing begins too early.	1. Not enough forward body angle. 2. Leg drive too weak. 3. Body is set forward too late on recovery.	1. Emphasize leg drive. 2. Legs Only Drill 3. Body Set Pause Drill
Blade Too Deep	Shaft buried during drive.	1. Hands too high during drive.	1. Bring handles towards body in level path. 2. ½ Blades Buried Drill.
Right-Side Lean	Boat leans to right during entire stroke cycle.	1. Hands are kept too far apart to avoid hitting. 2. Right handle too low.	1. Row with blades on top of water with hands together.

SCULLING: TECHNIQUE FAULTS (CONT.)

Below are some technical problems common to sculling as well as what drills can be done to address them. They are divided into the parts of the stroke that they occur.

THE FINISH

Fault	Symptom	Cause	Solution/Drill
Washing Out	Blades rising out of the water too early.	1. Hands drawn to waist not to chest. 2. Elbows too low.	1. Blade should stay buried through finish.
Dirty Finish	Not able to release blade from water.	1. Blade too deep. 2. Feathering while blade is underneath the water.	1. ½ Blade Buried Drill 2. Square Blade Rowing 3. Delayed Feather Drill
Short Stroke	Elbows never cross through the plane of the body.	1. Improper foot stretcher placement. 2. Blade is extracted too early.	1. See YOUR FIRST ROW- on foot stretcher placement. 2. Arms Only Drill
Oars Pulled Away	Button does not remain against oarlock at finish.	1. Thumbs are not pressed against end of oar.	1. Arms Only Drill with thumbs against the end of the oar.

THE RECOVERY

Rushing The Slide	Hanging at catch waiting for other rowers/ Boat feels heavy during drive.	1. Legs rise too quickly during recovery. 2. Hands are too slow away from body.	1. Count Drill 2. Pause Drills 3. Keep hands moving away from body in smooth, continuous motion.
Lunging	Too much forward body angle.	1. Body is not set forward properly.	1. Body angle should be fixed once legs begin to move up. 2. Body Set Pause Drill
Poor Balance	Boat dips from one side to the other.	1. Body is not centered. 2. Handles are not carried correctly.	1. Center body over keel. 2. Pause and Glide Drills 3. Shadow Rowing Drill

SCULLING: CAPSIZE RECOVERY

It is possible to either fall out of or capsize a single rowing shell. In fact, most rowers will encounter this problem multiple times during their rowing careers. As a result, Outdoor Adventures requires that all renters properly demonstrate the ability to safely enter a single rowing shell from the water. This must be done during the second class of Sculling I or in the Skills Evaluation/Orientation session prior to receiving rental certification.

The procedure outlined below is designed around righting and entering an open water rowing shell. These boats are heavy-duty and are sturdy enough to withstand the forces involved with re-entering. A lightweight racing shell, on the other hand, is quite fragile and may sustain damage to the gunwales and/or splashbox during this type of maneuver.

PROCEDURE FOR WET-ENTRY

1. Right the shell if necessary (it is often not) by pressing down on the rigger nearest you, and as the shell turns up on its side, reach up and pull the upper edge or rigger toward you. If it is very windy, you must either point the bow or stern into the wind to make the boat more manageable. Please take caution as the boat begins to turn over as the oars can strike you in the head.
2. Position yourself on the bow side of the rigger, facing the seat deck.
3. Place the oar on your side of the shell perpendicular to the boat with the blade feathered. Hold onto that oar handle with the hand nearest it; your hand, with the oar in it, will press down against the seat deck.
4. Push your body up on the shell using the oar nearest you for support until you are far enough across the shell to reach the oar on the far side.
5. Facing the seat deck, hold both handles in the hand closest to the rigger. Using the oars as support, by pressing the handle down against the seat deck, lift your torso up onto the boat by kicking your legs and performing a “pushup” type motion. Resist the temptation to pull on the far edge of the boat, as this will cause the boat to roll over again.
6. Once your torso is on top of the boat, swing your legs towards the bow and straddle the boat. Alternatively you can swing your legs towards the rigger so that you sit in a sidesaddle position. Either way is correct if it feels easier and more natural.
7. Raise the oar handles so that the blades are against the water.
8. Swing your legs into the boat.
9. Using the hand that is not on the oars, lift your body onto the seat by pressing between the tracks.
10. The Baycraft rowing shells used at the UCLA Marina Aquatic Center are equipped with a bailing device. To operate it simply pull up on the lever and push the chute down. The boat must be in motion for draining to occur.
11. All of the single rowing shells used at the UCLA Marina Aquatic Center may be rowed with the cockpit full of water. The ends of the rowing shells are airtight and will keep the shell afloat provided they have not been punctured.

APPENDIX 1: TECHNIQUE DRILLS

POWER APPLICATION

1. LEGS ONLY
   Description: Row using legs only. The blade is extracted when the legs are fully extended by pushing down on the handle while keeping the arms locked. It is important that the back remain in the catch position.
   Purpose: To work on the proper sequence of body parts during the drive as well as the seat- oar handle connection.

2. ½ LEG DRIVE
   Description: Same as above but only using half of the total leg drive.
   Purpose: To work on the catch and initial impulse of the legs.

3. LOCKED ARMS ROWING
   Description: Arms remain straight during drive and recovery. Blade is extracted by pressing down on handle while keeping arms locked. Drill can be done at any slide or stroke length- ½, ¾, backswing only.
   Purpose: To work on suspending weight on oar handle throughout drive as well as timing of backswing during drive.

4. SHORT-SLIDE ROWING
   Description: Stroke is shortened to varying lengths of slide. May include ½, ¾, 7/8 etc.
   Purpose: To work on sequence of drive, quick pick-up of pressure, and acceleration.

5. ½ PRESSURE LEGS, FULL PRESSURE FINISH
   Description: The drive is divided into two parts, legs and finish, with each being at different pressures.
   Purpose: To work on accelerating the oar throughout the stroke. Helps to feel how the leverage of the back at the midpoint of the drive is used to accelerate the oars.

BODY POSITION

1. WIDE-GRIP ROWING
   Description (Sweep Rowing): The inside hand is placed on the carbon fiber of the oar (past the wood of the handle) so that the hands are approximately 2ft apart. This drill may be done while rowing a full stroke or combined with a drill.
   Purpose: To set body orientation, work within the arc of the oar, and encourage the use of the outside arm to hang on the oar while minimizing the use of the inside.

2. PAUSE DRILLS
   Description: During the recovery the rower pauses at a predetermined spot for several seconds before continuing with the stroke. Common stoppage points include the body set, arms away, release, and ½ slide. Stopping at each of these points will address a specific set of technical problems. All of them, however, are good as balance drills.
   Purpose: Body Set Pause- Setting the body angle forward before the slide begins. Also slide control.
   Arms Away- Holding the shoulders back while the arms come away from the body.
   Release- Setting the boat after the blade has exited the water. Most important point for boat to be set. ½ Slide- Body position at the catch and slide control. Helps to address lunging

APPENDIX 1: TECHNIQUE DRILLS (CONT.)

BALANCE

1. SHADOW ROWING
   Description: The entire stroke is rowed with the blade(s) feathered. It is sometimes necessary to change the pitch of the blade as the rower transitions from recovery to drive so that the blade does not get caught in the water.
   Purpose: To work on balance and level hand paths during the drive and recovery.

2. GLIDES
   Description: The rower(s) pause at different parts of the recovery with the blades feathered and off the water. The point of the drill is to see how long the boat will remain level. This drill is usually combined with the aforementioned pause drill.
   Purpose: To work on uniform blade height as well as balance and timing.

BLADEWORK

1. SQUARE BLADE ROWING
   Description: Blades are kept square during the recovery to enforce the need for the blade to be extracted from the water before feathering. If all rowers in the boat are made to row then this drill is excellent for balance.
   Purpose: To work on blade position at the release, also for balance and blade height on the recovery.

2. DELAYED FEATHER
   Description: Blade is kept square slightly longer than normal after the release. As above, this drill addresses the release.
   This is easier than square blade rowing and is often a good precursor to that drill. The advantage to this drill is that it combines an emphasis on a square blade at the release with the need for feathering.
   Purpose: To work on blade position at the release.

3. ½ BLADE BURIED
   Description: A normal stroke is rowed with the blade buried only halfway during the entire drive. This should be done for 10-20 strokes.
   Purpose: To teach a subtle lift off the hands at the catch and throughout the drive. This drill is excellent for addressing blade depth during the drive.

RECOVERY

1. COUNT DRILLS
   Description: During the recovery the coxswain or rower counts the amount of time it takes from blade extraction to the catch.
   Purpose: To work on slide control or the ratio of drive recovery, simply vary the amount of time it takes for the recovery. The drive should take about 1 second while the recovery should take at least 2 seconds during anything but racing cadences.

GLOSSARY OF ROWING TERMINOLOGY

A

Aerobic: Literally, "with oxygen;" refers to the use of oxygen to produce energy in muscle cells

Anaerobic: Literally, "without oxygen;" refers to the two energy systems that produce energy without oxygen in the muscle cells.

B

Back or Backing: Refers to sculling or rowing backwards, also used as maneuvering stroke.

Backstay: Portion of the rigger used to provide stability to the pin.

Blade: Part of the oar used to propel boat.

Bow: The front of the boat. The bow points in the direction which you travel. Also name for rower sitting in seat closest to the front of the boat.

Bow Ball: Rubber ball that can help protect the bow of a rowing shell from damage.

Button: Part of the oar that keep oar from sliding through oarlock.

C

Catch: Part of the stroke where the rower puts the blades into the water.

Check: Force directed in opposition to the forward progress of the boat.

Clogs: Type of footstretcher similar in construction to a sandal. Used in beginning rowing shells.

Collar: See button.

Coxswain: The person in a sweep rowing shell responsible for steering and race strategy.

Crab, or catch a crab: When oar gets caught in the water during rowing stroke.

Crossover: Movement of one oar handle over another, primarily the left over the right.

D

Deck: material covering the top of the bow and stern sections of the boat.

Double: A two-person sculling shell.

Drive: The work portion of the rowing stroke when blade is squared and buried in the water.

E

Eight: An eight-person sweep rowing shell with coxswain.

Ergometer: A device, such as a rowing machine, used to measure the physiological effects of exercise. Commonly referred to as an "erg" or "ergo."

F

Feather: Blade position during the recovery portion of stroke. Blade is held flat so that it will not catch or dig into water.

Fin: The thin, flat piece projecting form he center of the bottom of a rowing shell.

Finish: The portion of the stroke where the oar blade is extracted from the water.

Footstretchers: The part of the boat into which you put your feet.

Four: A four-person sweep rowing shell.

Frontstops: Part of the track assembly that prevents the seat from sliding off the tracks.

G

Gate: Part of the oarlock that may be raised or lowered to take the oar out of the oarlock or prevent it from coming out during rowing stroke.

Grip: Part of a sculling oar where the hand is placed.

Gunwale: The raised edges surrounding the cockpit; built to prevent water from entering.

H

Handle: Part of a sweep oar where the hands are placed.

I

Inside hand: In sweep rowing, the term used to denote the hand closest to the blade.

K

Kilometer: Most common unit of measurement in rowing 1km = 1.2 miles.

L

Lactic Acid: Compound produced by anaerobic glycolysis, which is responsible for burning in muscles during a hard workout.

M

Master: A rower who is 27 years of age or older.

O

Oarlock: The device that holds the oar at the end of the rigger.

Outside Hand: In sweep rowing, the term used to denote the hand furthest from the blade.

P

Pair: A two-person sweep rowing shell.

Piece: A term used to describe a given period of work. Length of piece commonly measured in minutes, seconds, or kilometers.

Pin: The metal cylinder the oarlock swivels on.

Port: When facing forward towards the bow, the left side of the boat.

Power 10: A series of strokes when rowers increase pressure usually for strategic reasons.

Q

Quad: A four person sculling shell.

Quadriceps Muscle: A muscle located in the thigh that is responsible for a majority of the propulsive power in the leg drive.

R

Rate: The number of strokes taken per minute.

Rigger: The assembly projecting from the side of the rowing shell to which the oarlocks are attached. Commonly built out of metal or carbon fiber.

Rush: A technical problem caused by rowers sliding too quickly towards the stern.

S

Shell: Another term for a rowing boat.

Skeg: See fin.

Slide: The metal channels in which the seat travels. Also used to describe the motion of the rower towards the stern of the boat.

Starboard: When facing forward towards the bow, the right side of the boat.

T

Tracks: see slide.

W

Weigh Enough: Command used in lieu of “stop!”