Introduction to Sculling

by John Ferriss

Sculling is wonderful exercise for almost everyone, ages 8 to 88. Whether you are a recreational rower completely new to the sport or a sweep rower who wants to make the switch, this article is intended to give you the basic information to get you started.

Recreational boats are available in two styles: the catamaran-type double hull, and a single hull that is shorter and wider than the racing shape. Both types increase stability and make the motion easy to learn because the fear of tipping over is reduced. Racing boats are more difficult to balance and row, but provide the thrill of greater speed.

Regardless of whether the boat is for racing or recreational use, it will be equipped with a seat, riggers and oarlocks, stretcher, and oars. The sides and ends are identified as port or starboard, bow or stern (Figure 1).

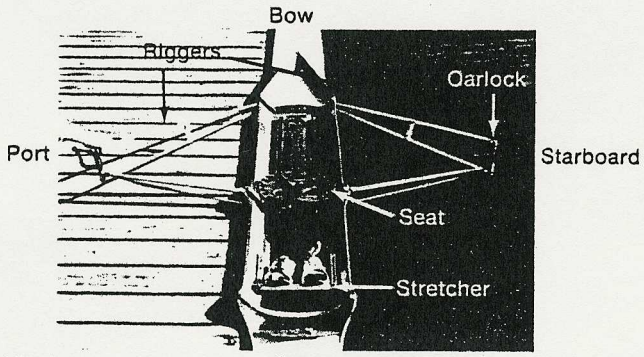


FIGURE 1

Rowing and sculling are very safe activities in and of themselves, but the practice of either involves assuming some risk. Swimming competence is a prerequisite to beginning water practice, not so much because it will be necessary to swim a lot (although many novice and a few experienced scullers do find themselves in the water occasionally) but because the ability to swim is a sign of comfort in the water. When a boat does tip over it is critical to stay with the equipment and swim to shore, or at least use the oars for flotation while swimming to shore. Water temperature, weather, and obstacles in the water are the major sources of danger for the sculler.

As a safety precaution, anyone who is over 35 or who has any doubts about his or her medical condition should check with his or her doctor before beginning to scull.

Getting Ready -- Rigging the Boat

As machines go, rowing boats are pretty simple to prepare and use. Before each row, nuts should be checked for tightness, and the sleeve and button on the oar need to be lubricated where they rub the oarlock. The axles in the seat and the pin on which the oarlock swivels need oil on a regular basis, weekly under heavy use. New boats require extra attention in order to prevent surprise attacks from loose nuts during the first few hours on the water.

When the riggers and the foot stretcher are attached to the boat, their nuts should be tightened onto the bolts just enough to make them snug, not so tight that they squeak. This precaution also applies to the bolts used to hold the riggers together.

The rest of getting ready involves putting the seat onto the tracks, setting the stretcher, and adjusting the riggers and oars (if necessary). The seat is usually made with an opening on one end so the bottom of the spinal column (coccyx) won't rub against the seat. Install the seat in the boat so the open end is toward the bow (Figure 1).

Some riggers are designed so that the oarlock can be moved relative to the boat -- closer or farther out (for spread, a factor in determining the force on the oar/lever), or toward bow or stern (for work-through, an important consideration in the arc of the oar). In either case it is recommended to set them at a fairly standard position, learn to row, and then adjust them as necessary. The manufacturer may provide special instructions (or Mike Vespoli's article in ***Rowing Fundamentals*** is an excellent reference for explanations and instructions on many issues in rigging).

The oars have a ring or collar (button) that clamps around the shaft and fits against the oarlock (Figure 2a). Its purpose is to keep the oar at the right position in the oarlock. Tightening the button into position is a simple operation with a screwdriver, but first measure the distance from the handle to the face of the button (inboard -- about 34.5 inches or 86 to 88 cm.) to get it in the right position.

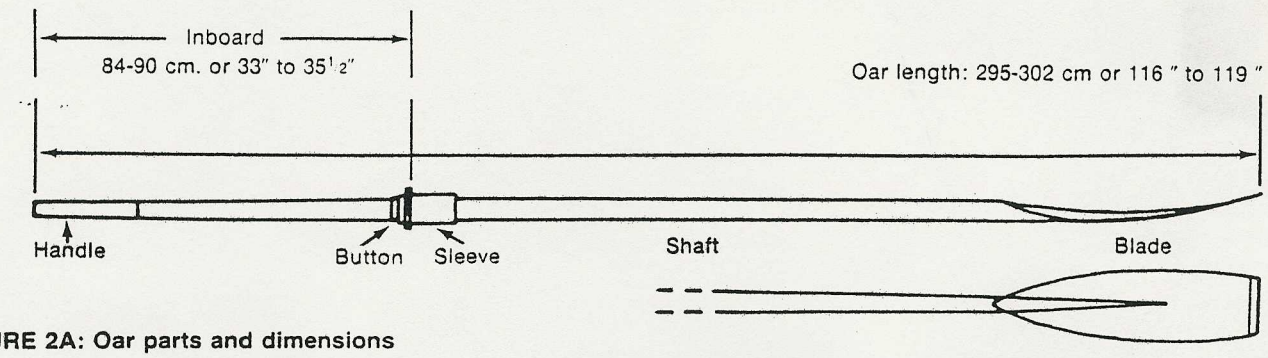


FIGURE 2A: Oar parts and dimensions

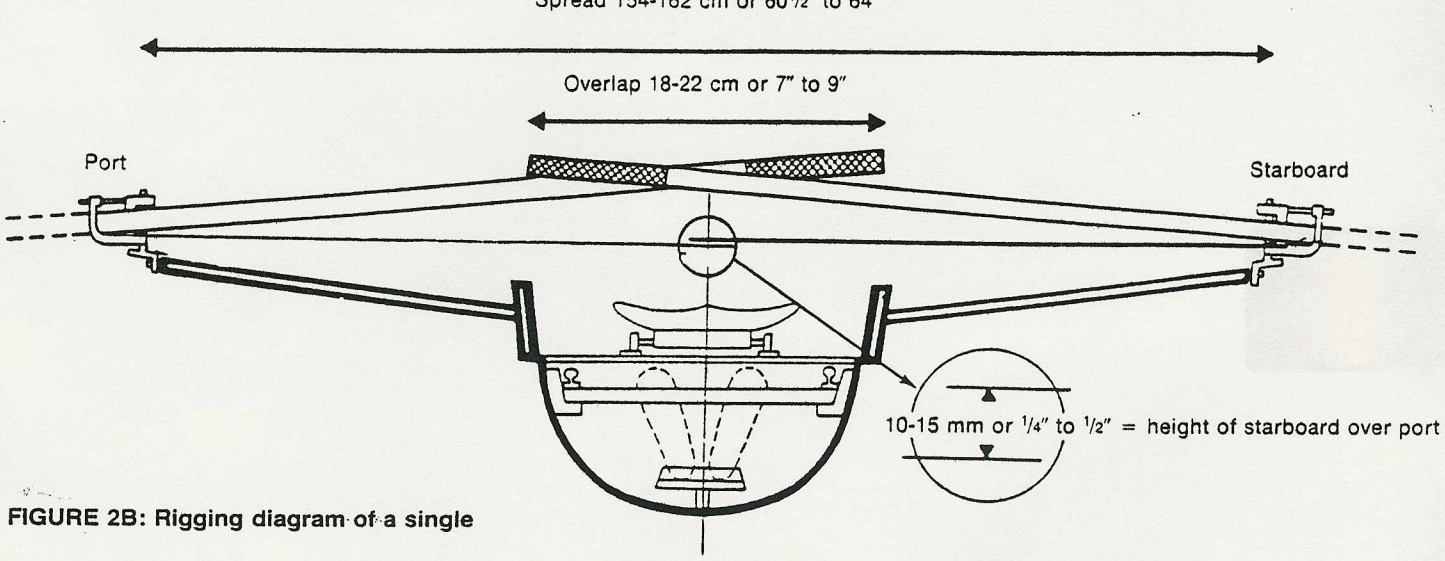


FIGURE 2B: Rigging diagram of a single

The numbers for oar length, inboard, and spread on the diagrams in Figures 2a and b (standard rigging dimensions for a single and oars) can be thought of as corresponding to the size of the sculler: taller people (6'2" and over) will use the larger numbers and shorter people (under 5'9") will use the smaller numbers; people in between can use median numbers or go either way. If spread and inboard have been set properly the handles will overlap seven to nine inches (18 to 22 cm.) when the oars are perpendicular to the boat (Figure 2b).

Oars are built with a flat side that should sit against the flat side of the oarlock and supporting brace (pin) during the pulling phase of the stroke.

One more rigging dimension is important for comfort on the water. During the pulling phase (drive) the handle should move along a horizontal line, but since the arms pull up slightly on the handle the blade may move too far into the water. So to keep the blade properly positioned in the water, it is necessary to tilt the top of the blade toward the stern 5-7 degrees. Inclining the blade is usually done by an adjustment of the oarlock (pitch), or by a combination of pitching the oarlock and attaching a wedge to the back of the oar inside the sleeve and under the button.

Wood and plastic oars will sometimes warp or twist as they get older, so it is important to know the total pitch -- pitch in the oar and pitch of the oarlock. Once equipment has been set and is comfortable, small changes may be needed from time to time.

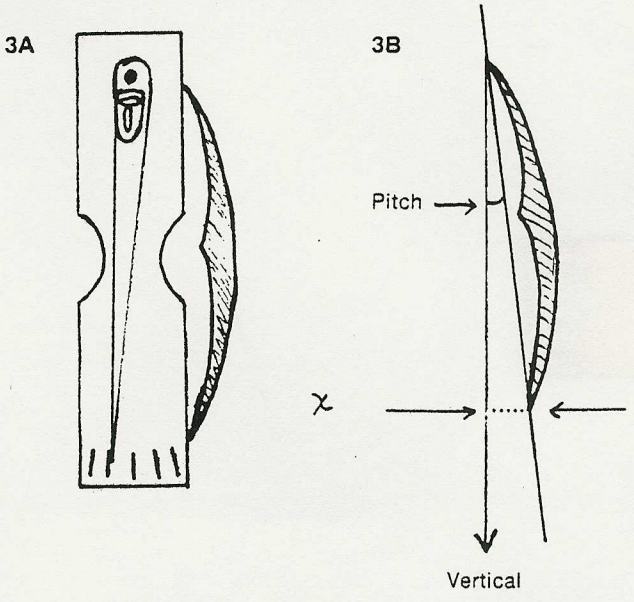
Lateral pitch, a slight tilt of the pin away from the boat, is usually built in to the rigger, so pitch of the blade changes during the stroke (for example: catch = 6°, mid-drive = 5°, finish = 4°).

Table 1

Blade width	×	Sin (Pitch)	=	x
170 mm		4 degrees		12mm
		5 degrees		15mm
		6 degrees		18mm
		7 degrees		21mm
		8 degrees		24mm

Pitch at the oarlock or blade can be checked visually by making sure that the top of the blade or oarlock is tilted toward the stern. This measurement should be made when the oar is perpendicular to the boat. (Note: when checking pitch at the blade the boat should be set horizontal, and the flat part of the sleeve held firmly against the oarlock and pin.) However, the truly compulsive sculler will want to measure the pitch. This can be done with an inexpensive angle measuring device available at most hardware stores; with a specially designed "Pitchmaster," or other pitch meter (Figure 3a); or with long unused high school trigonometry, by measuring the distance between a perpendicular line dropped from the top of the blade and the bottom of the blade ("x" in Figure 3b). Compare your measurement to those listed in Table 1, which is based on the relationship between the hypotenuse of a triangle (the blade), an adjacent angle (pitch of the blade), and the opposite side ("x"). In this case metric units make the task much easier.

FIGURE 3: Measuring pitch



Now the boat is almost ready to row. The last two settings, oarlock height and stretcher position, should be determined while sitting in the boat. Sitting at the finish position (Figure 4), blade floating in the water, the thumbs on the end of the handle should just touch the bottom of the rib cage. Adjusting the stretcher can move the body forward or back to the proper position relative to the handles. As will be explained below, many people prefer to set the starboard (left side when sitting in the boat) oarlock about one-half inch above the port oarlock. Height of the handles on many standard riggers can be changed by moving washers on the pin to raise or lower the oarlock (Figure 5). If no height adjustment is available on the oarlock assembly, a thin metal wedge (shim) can be inserted where the rigger attaches to the boat, at the top bolt to lower the oarlock and at the bottom bolt to raise it. Be careful with shimming, however, because it will also change lateral pitch.

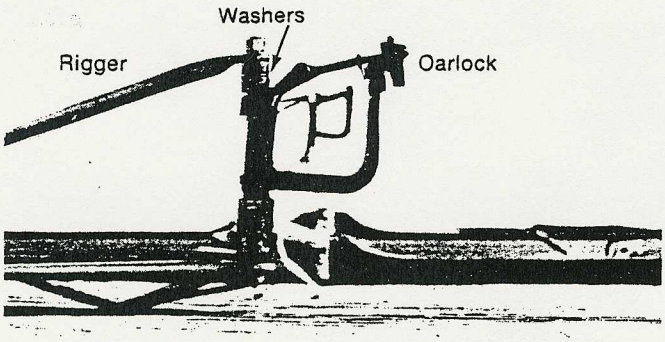


FIGURE 5

Getting In -- Points of Contact

Now that the boat is ready, it is time to get in. Some of the first things to notice about a modern rowing boat are that there is a special place for the feet and a funny shaped seat with holes in it. These, and the handles of oars, are points of contact with the equipment.

Getting into the boat from a dock can be a little tricky. Put the boat in the water parallel to the dock, and face the stern. Push the oar on the water side through the oarlock until the button firmly rests against it. Close the "keeper" on the top of the oarlock and let the blade float, concave side up, on the water. Grab both handles with the hand on the water side, and use the other hand to hold onto both the rigger and the dock. Use the foot nearest the boat to slide the seat toward the bow, then put the foot onto the stepboard or other place designated by the manufacturer as safe. (Be careful: a new boat can become a mess if a foot goes through the hull.) Now comes the hard part: transfer your weight gently onto the boat, then swing the remaining foot in, and sit down.

Since starting first grade a large part of each day has been spent sitting, much of that slouching, which has led to poor posture that should be corrected for efficient rowing. On a rowing seat, just as on a chair at the dinner table, the hips (pelvis) tilt back to slouch and tilt forward to sit properly. Tilting the pelvis forward causes the stretching of the hamstring muscles, so that two bones at the bottom of the pelvis (the ischial tuberosities) can be felt pushing into the chair. These two bones should fit into the holes of the seat. Wiggle around until they move into the holes. If the holes are too close together it may be necessary to make them a little wider.

Feet are placed on the stretcher, which may be equipped with flexible shoes, or a board (clogs) with straps to hold the feet in place. In either case, most boats provide a way of adjusting the position of the stretcher as described above. In a few boats there will be provision for changing the angle of the stretcher and the angle between the shoes. Most people are comfortable with the stretcher set at 38 to 40 degrees above horizontal, and 10 to 25 degrees between the shoes.

The rowing stroke causes the ankle to alternately flex and extend. Ankles should be sufficiently flexible to allow a sculler to move comfortably into the catch position with only a slight lifting of the heel off the stretcher. The vast majority of rowers will have no difficulty with this, but a few people with short legs may need to raise the shoe or heel cup to allow their legs and feet to be comfortable at the finish.

The third, and perhaps the most sensitive, point of contact with the equipment is the hands on the handle. The weight of the oar is supported under the knuckles with the fingers curving into a hook, thumb on the end (Figure 6a: oar squared). The hand doesn't squeeze the handle, rather, the fingers hook around it, similar to the action of pulling on a car door. When the blade is perpendicular to the water the wrist should be flat, on a line between the knuckles and the forearm.

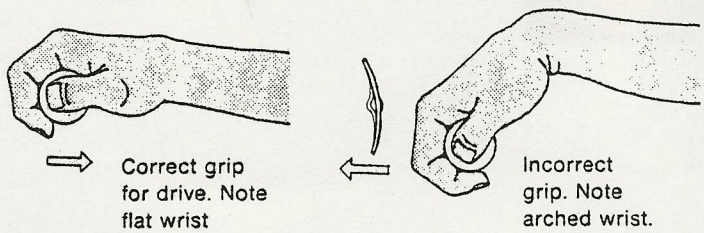


FIGURE 6A. Grip for the Drive

A loose grip on the handle makes it easy to feel the position of the oar in the oarlock. Only a little lubricant is needed and turning of the oar is done with very little effort. Feathering the oar, turning it from vertical to horizontal, can be done by dropping the wrist slightly (20 to 30 degrees) and letting the handle roll out under the fingers as the shaft falls over in the oarlock (Figure 6b: oar feathered; note the wrist position in Figure 7f and g). As soon as the oar is feathered the wrist can rise again. For additional comfort the forearm should be relaxed.

Turning the oar from horizontal to vertical (squaring) is just the reverse. Pressure from the fingers and finger tips rolls the handle back under the knuckles and the wrist rises slightly as the shaft falls over in the oarlock. The motion is gentle and requires very little effort.

Balance is affected by many factors, one of which is control of the handles. Once in the boat, one or both hands must always be in contact with the handles. If an oar is allowed to come loose and rotate parallel to the boat, a dunking is almost inevitable. In addition, keeping the handles at nearly the same height will help keep the boat stable while sculling.

The Learning Sequence

The sculling motion is easy to learn. The tricky part is handling the oars, which requires careful attention to the grip and hand motion at the transitions (catch and release).

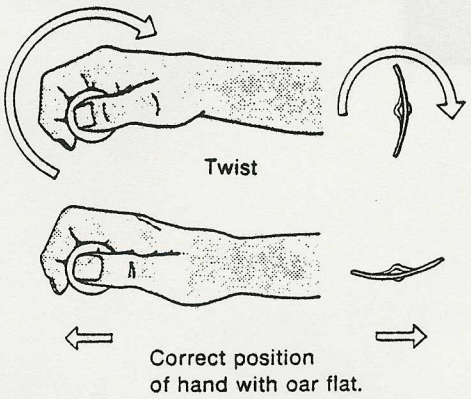


FIGURE 6B: Feathering the oar.

Learning to scull in a boat will be much easier the first time if someone helps steady the boat, either by holding it at a dock or by standing in shallow water and holding one side. The motion should be practiced with one hand at a time. But the hand, arm, and back motions can be practiced on land by balancing an oar on the end of a large book as though the book were the oarlock.

With both blades flat on the water, concave side up, first test the tipping range of the boat by rocking from side to side. Lower one hand and let the other come up, then reverse to the other way. Rock back and forth several

FIGURE 7: The Sculling Stroke

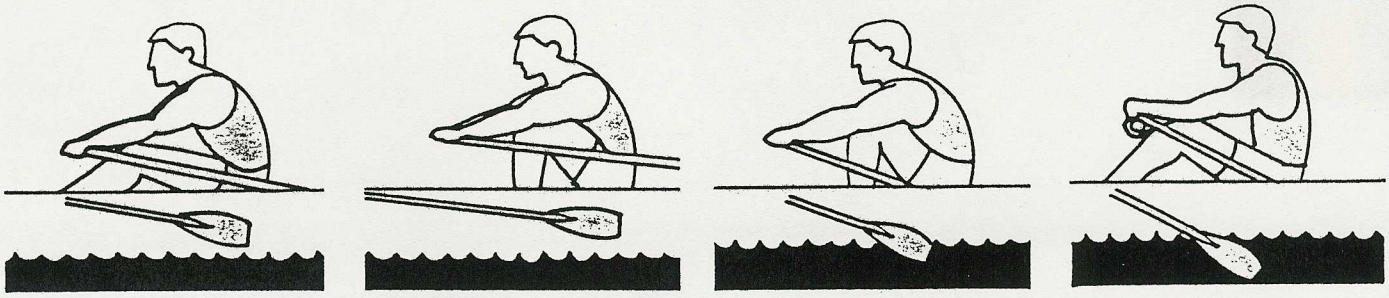
Study the body positions shown in Figures 7a through 7g. Use them to create a mental image of the rowing stroke. This visualization will help with the learning sequence.

Mid-recovery (Figure 7a)
The boat reaches its maximum speed per stroke during the slide forward. Hands move past the knees and lead the shoulders forward to establish body reach early, then the knees begin to rise.

Before the catch (Figure 7b)
The arms and shoulders are fully extended when the handle passes over the ankles and squaring of the blade begins; knees together in front of the body; thighs rise to meet the chest; and body weight is balanced between feet and seat in preparation for catching during the last part of the slide.

Catch (Figure 7c)
The shins are vertical; back and shoulders curve over the legs; lifting only the hands produces a very quick entry of the blades into the water; then the legs push the body toward the bow. Muscles of the back and legs link the scull handle to the stretcher.

Mid-drive (Figure 7d)
The legs dominate the early part of the drive, pushing the sculler's weight and the handles toward the bow, then the body takes over to "uncoil" naturally.



times and notice that the hands bump each other. This exercise provides a reference for what is a safe range of lateral motion.

Sit in a relaxed position (but not slouching), legs down (calves touching the boat), and shoulders slightly behind the hips. To find this position slump forward, lift the shoulders, then lean back until the stomach muscles are first felt contracting to keep the body from falling backwards. Square one oar so that the blade is perpendicular to the water, concave side toward the stern, and adjust the grip to match Figure 6a, as described above. (The handle of the blade not being used should be held near the body.) With the arm extended let the blade float in the water; then gently bring the handle toward the body so the thumb stops at the bottom of the ribs. Lower the handle to lift the blade from the water, extend the arm, drop the blade into the water, and repeat the motion.

After practicing with the arm only, increase the length of stroke by leaning forward after the arm is extended. Then lean back to the same position used above and bring the handle back to the body. Continue with arm and back, then repeat with the other side. The motion should flow through the sequence of positions in Figure 7; e, f, g, a, e, f, g, a (without the leg movement). Next practice the feathering and squaring motions with one hand. Do it a few times over the knees, then at the release; finally go through the sequence of feather, extend arms, lean forward, square oar, drop in, gently pull through, feather, etc. Do the same thing with the other hand.

Feathering makes the blade come out of the water easier and quicker. Lowering the handle raises the blade and turning the oar also raises the bottom half of the blade, so when the motions are combined the blade will come out of the water very quickly. Recovering with the blade flat allows it to be carried closer to the water and reduces air resistance. In the first few weeks of sculling the boat will be more stable on the recovery if the blades are allowed to trail along the water.

When ready to use both hands at the same time the challenge is to coordinate the overlap so that they move through the middle of the stroke without interfering with each other. This can be done in either of two ways. The riggers were put on the boat with the starboard oarlock about one-half inch above the port, so the left hand can be pulled directly above the right hand (Figure 7d). Or the right hand can be pulled a little in front of and below the left hand. Each sculler will find the most comfortable way to do this.

With a helper holding the stern of the boat, row with both hands, then use a little of the slide. On the recovery extending the arms will move the handle to the knees, leaning forward moves it past the knees, then as the seat moves the knees can rise without bumping the handles. When the blades are in the water the legs begin the drive and the back takes over as they go down.

Now the sculler is ready for a solo voyage. Most of the first practice is done with the legs flat for stability, but as

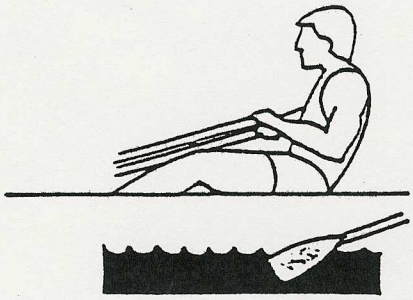
continued on page 31

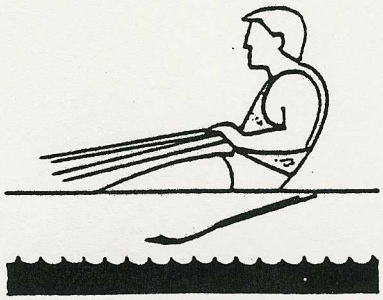
(Based on diagrams from Sculling Technique *by Thor Nilsen, courtesy of the Italian Rowing Federation.)*

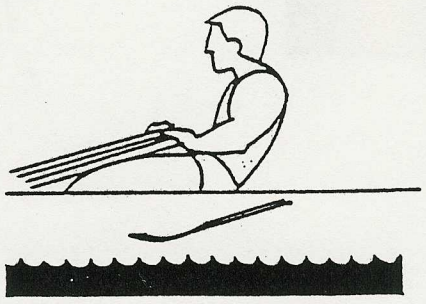
Finish (Figure 7e)
The legs finish their share of the drive first, then the back; weight of the body "hangs on" the handle as the arms quickly and firmly draw the handles to the body. Blades stay buried to the last instant.

Release (Figure 7f)
The legs and back hold the seat and body steady while the forearms move the handles down to lift the blades from the water; then feathering rolls the handles out to the fingers. This must be done quickly and smoothly to get the blades out of the water without getting caught. The infamous "crab" (getting the blade stuck in the water) is caught if the blade is feathered, even slightly, before the oar is lifted out of the water.

Early recovery (Figure 7g)
The body is kept steady as the arms extend to move the handles away from the body at a constant speed.







Sculling (cont.)

confidence increases it will be possible to use progressively more slide. Speed and quickness will also soon follow. As with any new activity, tension is the worst enemy of mastering technique, so try to relax.

As you start venturing out to practice your new rowing skills, you will need to work on one last one: looking over your shoulder. Take a quick glance during the drive or at the release, at whatever point you feel most comfortable. As a participant in the only sport that faces backward, you will need to get in the habit of looking around frequently to watch out for obstacles. Keep an eye out for other boats, as well as debris in the water, submerged rocks, or any other potential hazards. Obey any local rules of the water.

The learning exercises described in this article can be repeated as drills to improve parts of the stroke, and other drills will be described in a future article. Row with someone or have a friend take pictures and compare them to the diagrams on pages 28–29. It is rare for two people to learn a skill such as sculling at the same rate. Young people, ten to fourteen, will learn much faster than older people, so don't become concerned if it seems to take a while. Be sure the boat is set up properly. And for learning the stroke divide it into pieces, row around in circles to practice each, then reassemble the parts into the complete cycle.

Further Reading:

Rowing Fundamentals, edited by John Ferris, available from the USRA, #4 Boathouse Row, Phil., PA 19130

Sculling, Peinert Boatworks, 52 Coffin Ave., New Bedford, MA 02746.

Rowing the Rec Racer, by James Dreher, Durham Boat Company, RFD #2, Newmarket Rd., Durham, NH 03824.

Viewing:

"Flexibility for Rowing and Sculling", available from USRA. $20, 18 minutes, VHS.

"Introduction to Sculling", available in June from USRA.

"Introduction to Sculling the Rec Racer", Durham Boat Company, $39.95.

Credits: Our thanks to Peinert Boat Works and John Fortney for Figures 6A and 6B. Figures 2A and 2B: Courtesy of the Italian Rowing Federation.