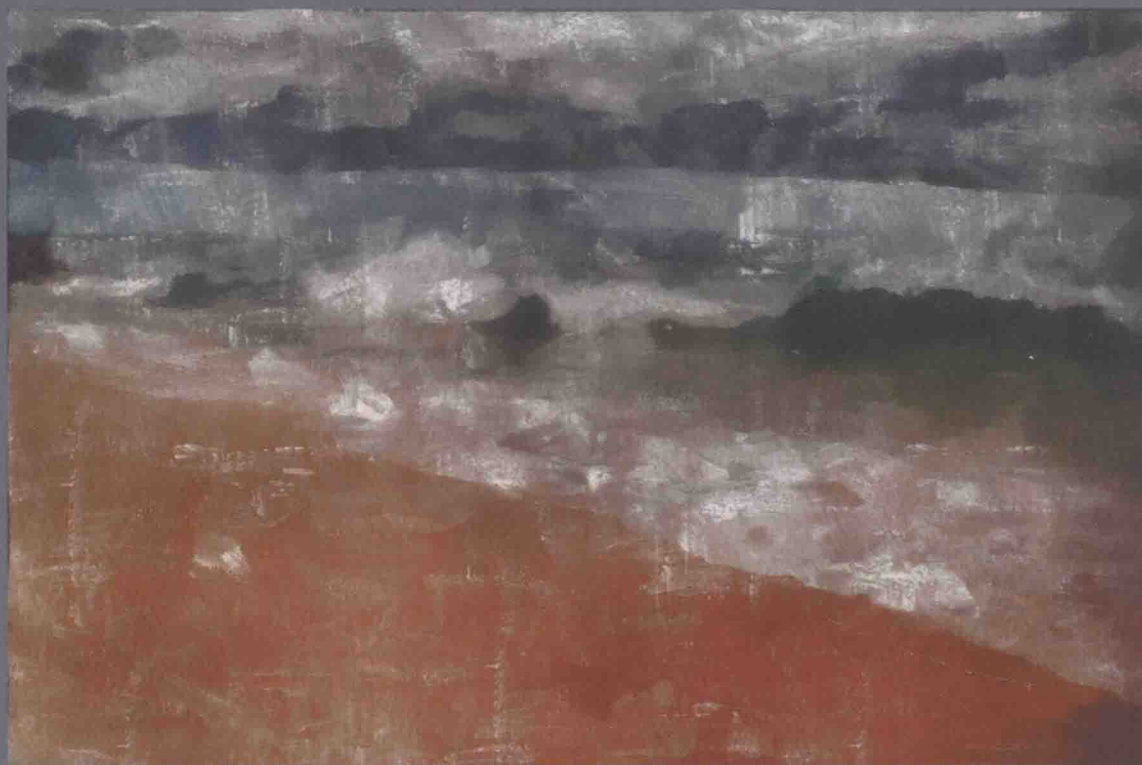


# PRACTICAL ROWING WITH SCULL AND SWEEP

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DARLING



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## PRACTICAL ROWING INTRODUCTION

Time may have been when rowing existed only as a means of getting from one place to another on the water,— a time which need not concern the present treatment of the subject, except as it furnishes examples for comparison with the art or, as it has come to be, the sport of rowing to-day.

Rowing very naturally divides itself into two branches; under one head comes Sculling or individual rowing, under the other head Rowing properly so called, collective and organized sweep rowing in pairs, fours, and eights.

Sculling in the single boat or shell presents many opportunities for individual development and form along what may be called the lines of least resistance. In the scull or shell the rower is sole master of his craft and is alone responsible for its movements. I say master of his own boat, for I suppose him to be a sculler. To be sure he has found, for a while at least, that the boat was almost master of him. Only with practice has come confidence and with skill has come individuality of style. As they vary in physical development, so their style of sculling varies, and lends itself to power in one part of the effort of sculling and favors a weaker effort in some other part of the stroke. It is for this reason that there are almost as many styles of sculling as there are scullers; and while one may impart to another the fundamental principles of sculling, the latter's working out of those principles is almost sure, for physical or temperamental reasons, to be at variance with them.

The other form of rowing — the concerted effort of two, four, six, or eight men in a crew—is a much more complicated matter. For obvious reasons I shall consider the eight as the sweep rowing standard. In the eight-oared crew it is necessary to subordinate the individual

to the larger crew unit. Therefore we must presently bring ourselves to think and say that the crew *is*, not *are*, rowing racing, or paddling. This fusing of the individuality of each man into the larger crew unit and the necessary subordination of individual characteristics can be accomplished without loss to those composing the larger unit, provided there is constant emulation and healthy rivalry among the candidates for the crew, and patient, constructive coaching from an impartial critic. For in a crew it is almost certain that there will be one man who is ideal perhaps in physical strength, — one who in this particular respect is just a little better than any one else. To attain to this condition of strength, or even to surpass it, should be the desire of the other candidates, while to this individual himself a quality of quickness or smoothness displayed by some other associate will appeal constantly, and he in turn will strive for its acquiring.

THE ROWING TERMS AMONG the traditional and generally accepted terms relating to different parts of the stroke in rowing — terms which have through constant repetition and the "drilling" process come to be apparently mere words — are the words "catch" or "beginning," "finish," "recover," "drive," "reach," "rushing the slide," "following," "shooting" or "tossing the hands away," "hanging," "slumping," "falling over," and other expressions suggestive of the proper and improper methods of performing different parts of the stroke.

To those who have followed rowing, or who have at one time or other rowed and been coached, it will not seem strange that the terms above referred to, often repeated and oftener shouted out to the crew by the coxswain, are set down by many as one of the necessary evils of the sport, a sort of "rigmarole" quite as inevitable as the cold shower that follows the order "Over the heads" from the captain after a sloppy after-

noon on the river.

It is quite as true that any humanizing of these expressions, or enlarging upon them, is out of the question at the time when the force of their meaning is most needed, as when the crew is boated and out for a spin, with or without the coach. Few crews desire to spend several minutes shivering through a sermon, and few coaches desire to rehearse generalities the import of which should be in the mind of every man who has any interest or desire to be even reasonably proficient in rowing.

To the end, then, of clothing these "dry bones" of rowing terminology with the garment of their various equivalents let us consider at first the meaning of the words or expressions in their most apparent and natural relations. In this way we shall see that these terms lose their strictly dry and technical aspect to assume a more human and intimate character.

#### The Catch

Among college men, where sport naturally receives greater attention than is possible elsewhere, a selection of one of the most salient features in the game of baseball will serve as a not unfamiliar example to illustrate one of the first moves in rowing, — the catch.

To the observer, the act of catching a baseball is a perfectly definite one, whatever preparation there may have been before the catch. If the actual catch is not visible, it is usually audible enough to leave no doubt of its being instantaneous. The element of gradual acquisition can be left entirely out of account, newspaper accounts of "high flies gathered in" to the contrary notwithstanding. It must be noted that only the act of catching is being considered, and it is seen that, confining ourselves to the act alone, the catch is instantaneous and definite after the preparation has been completed. So, then, to turn to rowing, the catch or beginning of the stroke, the application of power to move the boat forward — the change of direction after the reach — should be sharp, immediate, and snappy. Sharp, so that it may cut in cleanly; immediate, so that it shall lose neither time nor space;

and snappy, so that it shall be effective.

#### Drive

The drive, or leg drive, following immediately after the catch, is a very important part of the stroke. The old rule, "First make sure and then go ahead," might be rewritten, "Make sure of the catch and then drive the stroke through." The idea of drive must not be confused with the landsman's alternative, — ride, — as it is too often by crews. Drive implies an action wherein power is used. The idea of persuasion or coaxing is not present. The drive of the legs in rowing is imperative. The boat is no longer left to herself, but is driven by the man behind the oar. Moreover, the drive must be steady, not merely a kick or boost. A golfer must be a very "duffer" who is satisfied with a "drive" that sends the ball sputtering two or three yards from the tee. There must be the "follow" to the drive to give it weight and direction. So, in rowing, the position must be firm, the body controlled, and the feet pressing solidly and evenly on the stretcher throughout the drive, — and longer, for the leg drive is ineffective unless it acts on the water by means of the oar. Therefore, the drive in its larger sense is not confined solely to the legs, but is continued by the arms, and becomes, in fact, the very stroke itself.

It would be considered gross negligence on the part of a carpenter if he were to build a house and not drive the nails used in the construction all the way in. We should be obliged to go about completing the work he had left unfinished, or run the risk of catching on projecting nails and injuring ourselves or our clothes. Yet many crews forget to finish one stroke before beginning the next, and in consequence go stumbling from one half-driven stroke to the next, tearing up the water on the recovery, and for no other reason than that they have not driven clean as they went along. It is a mistake to think that quantity is an adequate substitute for quality. One long drive of the oar in the water from catch to finish, a drive which keeps the water piled up in front of the oar and leaves a chugging puddle behind the blade, is worth two or three

half-drives that commence and end in the air and include a momentary jab at the water somewhere in the middle of the stroke.

It is not unnatural to regard the leg drive as the most important factor in rowing a boat where a sliding seat admits of the use of the legs in addition to the body and arms. Even here, however, there is a chance that the leg drive will be exaggerated, — yes, will exaggerate itself to the extent of pushing away the slide without necessarily carrying the shoulders with it. To any one who has looked over Dr. D. A. Sargent's strength test charts, the fact that the legs are much stronger than the back must be well known. The legs are naturally the working members, and as such are capable of a greater effort than the complex muscular structure of the back. When, therefore, the leg drive is used in rowing, it is important that it be no harder nor quicker than the back can hold the shoulders up to, or even carry them ahead of, lest the oarsman render himself open to the criticism that he is "biting off more than he can chew." If the legs are driven down and the back is unable to hold the drive, nothing is gained; the back is left behind, and instead of driving everything before it, the legs have only driven the slide. The oar, instead of being pulled through, has pulled the oarsman back for at least part of the stroke. The leg drive must not catch the body unprepared, but rather find the body anticipating, by the fraction of a second, the getting away, — the getting turned in the new direction, after the recovery as well as after the stroke. For if the body work is to begin and end with the slide movement, the body must start quicker and move faster than the slide, because the slide or point where the body pivots moves in a straight line backwards and forwards, but the shoulders above reach in front of the slide on the full reach and then swing in the arc of a circle to and back of the slide at the finish of the stroke. Evidently, then, the shoulders and what controls them — namely, the muscles of the back and the pectoral muscles in front — must contrive to move the body

faster than the slide because the body has further to go in the same length of time. If it must move faster, it must start quicker. The quick overcoming of the inertia of the body, and the momentum imparted to it, serves to act to the legs as a balance-wheel does to an engine; for if the body can be started back simultaneously, or possibly just before the legs start their drive, its weight and its acquired momentum, coupled with the effort of the back muscles, can hold the hardest drive the legs are capable of, and for as long a time. Let the legs start just the smallest interval before the back is ready and the back has the well-nigh impossible task of overtaking the legs.

#### The Finish

Another point that deserves attention is the end, or finish, of the stroke. The end of anything is still the thing itself, and not something else. So with the end, or finish, of the stroke. It is not a part of the recovery, nor should it in any way anticipate the recovery. In this instance I am considering the motion of the blade in the water, and am presuming the balance to be even. If the finish is part of the stroke, then it must be governed by the rules which govern the stroke. The most obvious of these is that it must be in the water. It shares with the catch the quality of being instantaneous,—more so, if possible, than the beginning,—for the reason that at the finish the boat is moving faster, and the blade must be taken out more sharply if it is to avoid pulling the boat off keel. The finish may be the weakest part of the stroke, because while we had both the strength of the legs and that of the back combined in the first and middle parts of the stroke, the finish must be left to the arms almost entirely. It must be remembered, however, that the value of the arms is hardly less than the combined legs and back, for it was for

Rear View Of Position At The Finish. Elbows Down. *Page 10.*

them to start or pick up the boat, and then, having given the push, to leave the adjustment of balance, and the now comparatively easy task of carrying the constant pressure of the blade in the water, through to the end to the quicker

moving arms. It is much easier to keep the boat moving after it has been started than to set it in motion, so that, while the arms may not compare favorably in strength with the combined effort of legs and back, their actual value is fully as great, if not greater; for it is for the arms not only to finish up what has been started by the mechanical movement of legs and back, but also to reduce and adapt the mechanical movement to the requirements of balance.

To get the full value of the arms in finishing the stroke, the elbows should be kept down by the body, and not lifted out and away from it. This rule should be particularly observed with respect to the outside arm, — that is, the arm nearest the end of the oar handle, — in order that the power may be applied or continued at right angles to the oar and in the line of the forearm. In other words, it must be remembered that in speaking of pulling an oar, the word "pull" is meant, not "push," nor "let go," as the end of the stroke comes round. If the outside arm consisted of an upper arm, while for the forearm and hand a strap and hook were substituted, the value of this now miscellaneous composed member would not be perceptibly lessened as far as rowing is concerned. If it is borne in mind, then, that the outside hand should hook around at the end of the oar handle, and that the angle between the oar and the forearm should be maintained as near ninety degrees as possible, so that the hook can always pull and not be too busy holding, clinging, or climbing round the end of the oar (perhaps so as not to bump into the body), and not tend to slip off entirely and so miss being in at the finish, the elbows will come in naturally by the side, and the pull will be maintained as it was started — to the finish of the stroke.

#### Recover

The object of the recover,—or means to that end, the reach, — must be kept in view, but the recover itself must also be considered. A full understanding of the means will make the acquiring of the end more accurate. The recover might be called a prolonged dead-center in the stroke. It is the time when what has been

done must, according as it has been well or ill completed, carry the boat along and balance her at the same time. It is during this period that the crew must try to steal a march on its own boat by getting from its position at the finish of one stroke out again to a position of readiness for the next stroke without disturbing equilibrium or retarding speed.

Few crews find balance to be an inherent quality in the boats they row, nor do they find that during the recover their boats will acquire on-keelness that has not been given and left with them at the end of the previous stroke. A shell eight is manifestly top-heavy; and while it can be rowed along after a fashion on one side or the other, when the attempt is made to get ready for another stroke and the oars are withdrawn from the water and what little support there was is removed, the boat lurches to one side and a clean recover is impossible. On the other hand, if the boat has been carried through the stroke on an even keel and the power is taken off simultaneously by both sides finishing together, and moreover if the oars are lifted out in unison, there is no choice on which side the boat shall fall, and, aided by the steadying oars, she hangs in the balance. While she thus hangs, the crew steals out to the next stroke. In using the expression "steal a march," the simile, in so far as it suggests the skilful and careful control of the motions of the crew as distinguished from blundering haste with its scuffle of oar blades, applies to a less strenuous sort of rowing, though it may be said to underlie any form of rowing in shell boats. For the most part, however, where rowing practice looks toward racing, the oarsmen must assume a more frankly aggressive position and must acquire, actively, the control over their boat.

This brings us to the consideration of the values of inertias in an eight-oared crew in their relation to the recover. An average eight-oar crew will weigh rather more than three times its steersman, boat, and oars' weight. It is important that this excess of weight, this inertia, contribute not only to momentum, but also to balance. The oars may, and



unquestionably do, contribute much to balance; but it can be easily seen that, with a cross wind, the oars on the side from which the wind is blowing will tend to unbalance the boat more than the opposite oars can tend to balance. It is in such cases that the inertia of the crew should be directed toward holding the boat from rolling. This can be accomplished only by forcing the inertia of the crew into the boat through the feet and stretcher, since these are the only fixed points of contact. That this is intended in present-day rowing appears from the fact that the feet are held in the stretchers as in a sandal. More, they are held, one on one side and one on the other side of the keel, thus making adjustment of balance possible by varying the pressure, or lift, with one foot or the other on or from the stretcher during the recover, and for the same reason that the oars balance the boat *The oars, by their length, act as balancing poles or long levers, while the diminished length of the lever on which the feet act is in some measure compensated by the weight or force exerted through that short lever.* The toe straps, as they are called, are to the recover what the stretcher is to the stroke. They give the rower as firm a hold on the boat from within and as much control as he has a mind to exercise.

When favorable conditions of weather prevail and when a crew gets its bearings, its swing or beat, and above all, its watermanship, this use of the toe straps throughout the recover becomes less necessary, and is scarcely more used than to bring the crew back on its stretchers as the bodies start the recover.

#### Rushing The Slide

One of the most persistent faults among crews is that of rushing the slide during the recover. The idea of rushing is about as foreign to the meaning of recover as was "grab" to "reach," some lines above. We speak of recovery of property, of recovery of health from weakness to strength, and we mean we are getting back our property, are getting back to health and strength. We have n't it back; we are getting it back, or recovering. There is an idea of grad-

ual reacquisition. This gradual getting back is not described, nor can be termed rushing. As convalescence looks toward health, so recovery. And the recovery in rowing, a going from the weakness of the position just after the finish of the stroke to the position of strength from which to drive the boat again, is a gradual movement in which rushing can have no part.

The slide on which the oarsman sits is a sort of movable thwart which enables him to move back and forth in a horizontal squat. It is the lack of control in bringing the slide out to the full reach that constitutes rushing the slide. The cause of rushing is mainly the fault of not getting started on the recovery soon enough, and, consequently, having to make up for lost time by hurrying the last part of the movement. More than this — more than the desire to get out to the full reach on time — is the desire to get there while the boat is on keel. It is something that suggests football to see a crew diving out for the full reach, lunging forward to tackle the water with the firm conviction that the end amply justifies the means.

The effect of rushing the slides is to stop the headway of the boat between strokes. In rushing out on the slides, the crew acquires considerable momentum in a direction opposite to that in which the boat is travelling. To be more accurate, the crew tends to remain stationary while the boat glides forward. So far so good. Now the crew has come to the end of its slides and is brought up on its feet all standing, and that, suddenly. Eight men have stopped themselves on their stretchers or foot braces, as if landing from a jump. These men weigh between twelve and thirteen hundred pounds, while the boat, with coxswain, weighs about four hundred pounds. Is it any wonder, then, that the boat slows down, if she does n't quite stop, when *three times her own weight pushes suddenly toward the stern* for a moment before catching hold of the water with its oars? Something must give way, and that something is the speed of the boat. The two remedies for stopping the boat between strokes are, first

and obviously, slowing the slides; and, second, a quicker catch. With a slowed slide the stop is less jerky, and tends less to push the boat astern. A man may be able to crawl on all fours over ice which is so thin that, should he stand up, he must inevitably break through. So a crew, by distributing the weight that must be stopped through the recovery, instead of having the weight come to a stop all at once, — in other words, by letting itself down easily on its foot braces, — will not check the speed of the boat, and will be in a stronger position for the catch.

The other method for curing the hitching or stopping of the boat between strokes, while not altogether to be recommended, is possible to good watermen. It consists in catching the water quicker, and before the boat can lose way. This style of stroke is more on the wound-up order, and reduces the body work forward and back to a minimum, and leaves the stroke to be rowed with legs and arms. The reason for reduced body work may be found in the speed or rapidity of the motions. It would be quite impossible for the body to keep up with the wound-up stroke without an effort which would wear out the crew. As it is, the crew rushes forward to the full reach with bodies but slightly inclined. The tendency to overreach, or to fall over on the full reach, is minimized by having this part of the movement reduced to a slide reach. The fairly erect body in its natural position permits of getting the oars in as soon as the slide end is reached, and more quickly than when, with body inclined beyond the perpendicular, the angle between body and arms is greater and the position a more strained and unnatural one.

So, then, the wound-up stroke has an element of naturalness and simplicity to commend it. The work is done by the working members—the legs and arms. It is a stroke, however, of quantity rather than one of quality. The object is how many, rather than how well. As a remedy for stopping the boat it is a superficial one, and does not correct, but rather counteracts, if possible.

The Full Reach Is In The Water. Page

19.

*Compare plate facing Page 52.)***Reach**

So closely allied to the catch of the water is the reach, or full reach, that it is worth while taking it up in immediate connection with the catch. I shall consider the full reach as being more exactly identified with the catch.

The position at the full reach, or full forward, is at the logical limit of the reach proper, or at the end of the recovery, so called. It is evident that the full reach is a definite though not necessarily fixed point. It remains to determine where this point is with reference to the oar blade and the water. The end of the reach, or full reach, is the end of an effort to reach something, and that something is the water. The mere arrival at the end of the body and slide reach in-board is not, of necessity, the full reach, as many seem to think. Rowing comes under the head of aquatic sports, and is not a simple gymnastic horizontal squat. The arms are the most important features in the full reach. It is they, and the control over the oar which they exercise, that let the body and legs get at the water. It is of primary importance, then, that while acting in sympathy with the legs and back, the arms still and always follow the water. And by this is meant that the adjustment of the arms for one full reach may not do for the next stroke nor the second. The exact place where the water may be found at the full reach, the exact angle between the arms and the body, is variable as balance varies, as conditions of the water vary from stroke to stroke and from day to day.

The dictionary meaning of the word "reach" may not be entirely without a helpful suggestion. To reach for, to seek to attain, implies a gradual, prolonged effort, which is in marked contrast to the meaning of to grab after, or to snatch. In the case of reach, the idea of balance, deliberation, calculation, and judgment exists to a greater or less extent. In the case of to grab, the idea of acquisition is foremost, and the means to this end are of little moment. The same word is used, and the same gen-

eral idea conveyed, when speaking of reaching for a fragile vase on a shelf as when speaking of reaching for the water in rowing. The only difference is that in one case what we reach for is fragile; in the other, that from which we reach must be carefully treated — the balance of the boat must not be destroyed by a lunging, helter-skelter grab for the water following a hurried or rushed recovery.

**Hanging**

In connection with rushing, and as an outcome of it, we may consider what is termed "hanging," or "hanging at the full reach," and also "falling over." An individual may hang at the full reach, or a whole crew may be guilty of "hanging." They come to the full reach supremely unconscious of where they are for the moment. The body is as far forward as it is going, the oar blade has gone as far toward the bow of the boat as it can, and yet it has not reached anything. It has not reached the water, but hovers over it. Can a crew imagine that the boat is still to keep on travelling ahead while they hang on the full reach? It would hardly be fair to impute such ideas to any crew. What the trouble is, and why an individual or a crew hangs at the full reach, may be ascribed to two causes, the first and principal being the rushing of the slide. In the case of the individual who rushes his slide, his rushing gets him out to the full reach before he or the rest of the crew is ready to catch. To be sure, his slide has a perfectly definite line of action; not so his body. If he has stopped or come to the end of his slide very suddenly, his body will be less sudden in its halting if, in fact, the body has not been toppled over by the sudden stop. Suppose, however, that the body has stopped, as it were, close on the heels of the slide; considerable effort is required merely to halt the body, and unconsciously, perhaps, attention has to be given to the detail of this manoeuvre, and the main point has been forgotten, namely, that when the body ceases to move forward it should instantly start in the opposite direction with no pause to break the cycle or continuity of the stroke. The same reason

that prompts us to slow down for a very sharp turn, as, for instance, a street corner, should dictate a similar course as the one to pursue in coming to that change of direction at the full reach. Hanging at the full reach might be described, reverting once more to the turning the corner, as coming to the turning point, stopping, facing about, and then proceeding off in the new direction. There is enough of military precision in rowing without introducing halts or conceiving of the broken continuity of a cycle.

The other reason for hanging at the full reach is that an individual who tends to rush his slide will find himself at the full reach before the rest of the crew and, rather than catch ahead, he will wait, or hang, until the rest of the crew are way forward. The remedy is the same: slow the slide and row the stroke through longer.

**Falling Over**

Falling over on the full reach is but an aggravated hang, or a delayed body reach. That is, as remarked some lines above, it is found impossible to stop the body at the same time as the slide; the body tumbles down into the boat and the oar blade goes skyward. The result is that before the next stroke can be rowed, the body must be lifted up out of the boat perpendicularly until it is in a position to act in a horizontal direction. The delayed body reach is hardly more than another description of rushing the slide. In this case we consider that the slide has been rushed out leaving the body behind. If the body were to stop under these circumstances at the same time as the slide, it would have acquired no reach at all and would be bolt upright or even inclined backward. It would then remain for the body to get its reach after the slide had stopped, and as quickly as possible. Getting a reach under these conditions could be little else than a lunge forward and an inevitable fall over on the full reach.

**Shoot**

As a remedy for this tendency to fall over we may consider the "shoot," or shooting away the hands, and the follow, or blending in of the body, with the

motion of the hands.

We consider that the stroke, as far as it has been in the water, has been rowed through; the boat is moving ahead at its best speed and the oars have been lifted out of the water by dropping the hands after they have touched the body. Combined with this dropping of the hands is the "shoot" referred to above. It is natural enough to associate a gun with the idea of shooting. The actual shooting of a gun is not a gradual act, it is sudden, instantaneous, and sharply defined by the explosion, and is consequent upon pulling the trigger. Furthermore, we speak of muzzle velocity as being the greatest which the projectile has in its flight, that is, the start is the quickest part of the flight of the shot. After this, the shot moves slower and slower till it is "spent." The requirements for the shoot in rowing are similar to those which have been noted as incident to a gun shot. The first requirement is initial velocity — getting the hands away from the body instantly, their motion being quickest at the beginning as in the case of the shot. The use of the word "toss" for "shoot" can be justified if we are willing to substitute "gather" for "catch" in rowing. It's too leisurely a term. If we are to get the oar out of the water and away cleanly, it must be done quickly with a "drop shoot"

#### Following

Initial velocity exists, as the words suggest, only at the beginning; and this is the part of the shoot and the only part that we need to consider, for the reason that the recover is a controlled and comparatively gradual movement. The shoot must therefore be brought immediately under control before the arms have become straight, else there will be a hitch or break in the rhythm between the time when the arms have moved as far as they can go and the time when the heavier body can be started out after them. The blending of the movement of the body in the recovery with that of the hands and arms is accomplished by following. Having cleared the water with the oar blade, and shot the hands away, we must get after the hands with the body, or we must shoot the hands away

to arms' length no faster than it is possible to follow them up with the body. And, that there may not be too much slowing down thus early in the recover, the body should be started almost at the same instant as the hands. In this way the blend between body and arms is made more gradual, and the quickness in the early part of the recover allows a perceptible slowing down for the true reach. It must be borne in mind that it is easier to differentiate between fast and slow than it is to go from a slowly started recover to a still slower full reach; for if the start of the recover be slow, the only change to be made will be to go faster, and instead of steadying down for the full reach we shall come tumbling forward, any way to get there, and "hanging" or "falling over" will follow as a natural sequence. Following is not accomplished jerkily nor by allowing the body to stay back until the arms are straight. The recover is not jerky and is not to be done by fits and starts. To blend arms with body and body with slide, it must be the endeavor of the oarsman to make the straightening of the arms carry the body with it. He must see that the whole forward movement is smoothly continuous, and that when the arms have about finished moving at the elbow the body shall take up the motion, and when the arms and the body have moved sufficiently to uncover the knees, the slide should follow along. The greater the skill, the closer will be this following, until it will almost seem as if all started at the same moment.

#### Slumping

When the stroke has been rowed through and the oar is being drawn in to the body by the arms for the finish, care must be taken that the pivot shall be always at the slide, and that the body shall remain straight throughout its length. It is at this point that the back displays a tendency to round out, bending from a hinge about half way up. There are several results arising from this slump at the finish, the most evident being that if the body is not kept up at the finish, either the finish will be neglected or it will necessitate drawing the hands in at an unnatural level, thus impairing the

value of the latter part of the stroke. Another thing about slumping is that it is a perpendicular drop into the boat or a settling, and as such tends to sink the boat deeper. Following the slump there must be a recover, and this means lifting in the boat to get back into position for the next stroke.

#### Meeting The Oar

Closely allied to slumping is meeting the oar. Instead of holding the body back firm and rowing the oar in to it, the body is pulled up to meet the oar after the legs are down. In this way the stroke is shortened by the length of the body swing backwards beyond the perpendicular; for, if the body goes to meet the oar, we must infer that the boat is stronger than the rower, and that as he could not pull the oar and the boat through to himself, he pulled himself up to meet the oar. Slumping, then, may be called a weakening of the finish, and meeting may be termed a shortening of it. The cure for both is to stand well on the feet, and to swing straight back beyond the perpendicular, pivoting only at the hips, and holding the body firm anchored until the hands have been drawn in to it and started away again.

While the matter of meeting is up it may be well to mention the difference that there is in this one respect between scull rowing and sweep rowing. The oar handle in a sweep goes across the body and is only pulled in to it, consequently the body must swing well back in order to give length to the stroke, — particularly in a slow stroke. In the case of the sculling boat, the sculls are finished outside and past the body at the end of the stroke. This makes a shorter body swing back possible, and even allows the sculler to do what in the sweep oar would be called meeting. Only here it is not meeting for the reason mentioned above; namely, that the sculls do not have, to stop at the body, but can be pulled well by it on either side, and the length of the stroke thus maintained.

#### II. OARS AND A BOAT

It is time to get into the boat and try some of the movements just described. An eight-oared boat is a delicate piece of mechanism, and should be handled

with precision and unity of movement. First of all the oars must be brought out on the float, four starboard or right hand oars, and four port oars to be used on the left hand side of the boat. In an ordinary row boat there is no left or right to be looked out for in the matter of oars, but with the spoon oars the case is different. Each oar is "buttoned" at about three feet and one-half from the handle end. The button on the oar is a metal or leather collar around the oar to prevent its slipping out through the rowlock. The leather, which is a sort of cuff surrounding the oar and extending from the button three or four inches toward the blade, is fastened to the oar by a row of tacks in each of the edges that meet around the oar. This fastening is in the plane of the oar blade, that is, if the blade of the oar is perpendicular, as in rowing, the fastening should be uppermost in the rowlock, leaving the part of the leather which rests against the lock smooth and without joints. I have said *should be* rather than *is* uppermost, because an oar may be put in a lock on either side of the boat. The oar, however, is further adjusted so that when it is resting flat on the water the blade is not perfectly level, but has its forward edge slightly tilted up to prevent its catching and carrying under when it strikes a wave. On the up-tilted side of the oar then, and when the oar blade is flat on the water, on the side nearest the bow of the boat should be the fastening of the leather. This must be carefully observed in placing the oars in their oarlocks or it will be a source of trouble if not disaster before the crew has taken many strokes.

The oars having now been picked out, are carried down and placed with blades extending over the inside edge of the float so that the blades shall not be in danger of being stepped on when the boat is brought down. If the leathers are new and dry, a little grease should be rubbed on to insure their turning easily in the locks. The eight oarsmen then take their places to lift their boat from the racks at the command of one of their number, or whoever is in charge. With four on a side the ship is carried out to the float, care being taken to keep her

always "on keel" whether upside down or as she is to float. The eight men should be in step and should remember that from the instant they touch the boat and all the time that they are rowing or handling their craft, they should act in unison and under the orders of the captain or steersman. Each man should feel the edge of the float with one foot as the boat is being put into the water and the boat should be lowered into it so that she shall not scrape or touch anything which will in anyway injure her. Further, she must go in "all at once," that is, both ends should be on a level and should touch the water at the same time to avoid straining. The men at the bow and stern of the boat hold her off the float, the coxswain adjusts the rudder, and the others get their own oars and those of the men holding the boat.

If the crew is not manning its boat directly, the outside oars should not be allowed to float with blades in the water as a breeze or current will swing the oar round so that it cannot be reached when it comes time to get into the boat. The oars should, in this case, be slipped into the locks and allowed to rest across the boat on the gunwales. The inside oars, of course, should be shipped, pushed out to the button, and the pins locked, or the oarlock closed, by whatever device happens to be in use.

Where, as in America, most crews are rigged over the keel, the men take the places assigned to them at the order, "In Starboard" (and, or) "In Port," or some like command, the side not embarking holding the boat away from the float so that she may not rest on her outriggers.

A good many men in bringing down a boat and manning her for the first time seem to forget that they really did carry with comparative ease a craft between fifty and sixty feet long. That she was light enough to be carried must testify to a lightness of construction, as well as to the brawn of the carriers. This lightness of construction must be borne in mind when getting into the boat and the strictest circumspection exercised. Let us suppose that the order has come "In Port." We will further suppose that the port or left hand side of the boat is away

from the float. The oars being in position, resting on the gunwale, the port men stand opposite their outriggers on the float facing the stern of their boat. First the port men seize the handle of their oar at the very end with the right hand, push the oar out to the button and with the right foot step on the framework, which supports the track for the sliding seat and between it at the end nearest the foot braces. Still facing the stern and still holding the oar in the right hand the weight of the body is thrown on the right leg, and squatting slowly on this leg, the left foot is placed in the foot braces, the left hand helping to support the weight of the body by holding on the gunwale till the rower is seated on the sliding seat.

The right foot is then placed alongside the left in the foot braces or stretcher. This rule, for it may be called a rule, is almost inflexible, and in the case cited above the starboard men get in in the same way. Facing the stern, the right foot is placed between the tracks on which the slide moves and on the framework, never on the bottom of the boat, and the body lowered into the seat steadied by the disengaged hand.

*No rowing boat with outriggers, that depends on the oars to keep it balanced in the water, should be entered until those who are to man it have in their control that on which the balance depends.*

Having taken their places in the boat the members of the crew must remember their numbers. Bow is number One, and so down to Stroke, who is number Eight. The bow or starboard side has the odd numbers, while the stroke or port side has the even numbers.

#### Rowing In Fours

In the early stages it will be advisable to row in fours. The Bow Four, comprising bow, two, three, and four, may row for a time, while the remainder, or Stern Four, keep the boat steady. Number Five will have to give Four a little more room for his forward swing, and do this without getting his oar where it will interfere with Four's finish. Number Five should slide up and hold his oar between his knees and his body. A similar economy of space should be prac-



tised when one side of the boat only is rowing, as in turning around. In this way, those who are not rowing keep out of the way of those who are, and at the same time they can keep the boat on keel by holding the oar handles well up and maintaining a steady pressure with the oar blades on the surface of the water.

#### "Waist-four"

In order to give the whole crew practice and also to link the Bow and Stern Four together without rowing the whole eight, what is called the "Waist-four," comprising numbers Three, Four, Five, and Six, may alternate with the Bow and Stern Fours, and as the crew gets to handling itself better the two men at the bow or at the stern may join with the Waist-four, while the remaining two steady the boat.

In the early stages of rowing there is enough to think of without the added effort of trying to row with the boat first with one set of outriggers in the water and then the other. It is for this reason that practice in the tank or on the machines, or else in a broad, steady boat, or a narrow, steadied boat, is quite necessary until skill and confidence are acquired. As soon as confidence and skill permit, the whole crew should row together, else with too much work in fours, the men will find that with all eight rowing, the boat will run away from them at the beginning of the stroke and they will be slow in catching up, or will fail really to drive the boat until the stroke is half over. A half stroke may be better than no rowing, if one is willing to do things by halves, but it is at best a lazy way of getting a boat along.

Each man in the boat should be sure, since his oar is in an oarlock, that he has fastened the lock. The oarlock, if left open, is liable to spread, and let the oar slip out at an awkward moment when the crew is backing or holding, or when the water is rough and the oar strikes a wave during the recover.

#### The Stroke Unit

Having pushed off from the float let us suppose that the coxswain gives the order "Attention, Stern Four." Five, Six, Seven, and Stroke sit erect with legs

down and thighs horizontal, hands grasping the handle of the oar and far enough apart to give room for the body between them, at the finish of the stroke, without having to pull either hand across the body. The arms should be straight, the oar blade flat on the water, and the stern four prepared for the next order "Ready." At this, they reach forward, and because they have a slide they reach with it as well as with the shoulders. That is, the same word that naturally governs the forward motion of the shoulders should also govern the movement of the slide. If this is observed, there will be *slide reach* instead of slide rush out to the full reach. Then comes the order "Row" or "Paddle." The oars are turned so that the blades are perpendicular and covered in the water, the back and legs are started, the arms remaining straight until the legs are nearly down and the back past the perpendicular. Legs and back having done their part of the work there still remains the draw-in with the arms to finish the stroke. This should be done steadily and smoothly and not with a jerk, pulling the body up. The boat is now in motion, and in order that the oars shall not drag or stop her, the blades must be lifted out sharply and the body brought back to attention. To do this requires that the hands get away from the body, where they have just finished the stroke, sharply, with a "drop shoot." Instead of waiting at the attention, however, the recover is carried out to the full reach and the stroke pulled through again. The start was made at the order "Attention," and the stroke beginning there is not complete until the body and oars are once more in the position of "Attention." The boat could not move ahead if the oars were to stop at the finish because as we have seen the finish is part of the stroke and is in the water. If the boat is moving and we call the finish the end of the stroke, or the end of the cycle of the stroke, we shall only move the boat the length of that back swing. The oar blade must be lifted out and away ready for the next stroke. If the order be to "Let her run" (stop rowing), we must be prepared to "Hold" or

"Back," as may be necessary. The position of attention is the best starting point for another stroke or for a change such as is involved in backing or holding, for it permits the boat to run along, oars flat on the water and offering the least resistance to it. On the other hand, if it is necessary to stop the progress of the boat through the water, the position of attention, with body erect and arms straight, gives the body, already in a strong position, more time to adjust itself to this requirement than if the oar were in close to the body, as at the finish.

But to return to our Stern Four. They are rowing each man for himself. Later we may be able to say the Stern Four *is* rowing, but at present they *are* rowing, and we may look at them and see what the most obvious faults are. For the time they have not to concern themselves with keeping the boat on keel, the Bow Four are looking after that.

Stroke, or number Eight, has evidently rowed before, as his ability to put his oar in and take it out of the water clearly shows, but his inboard work needs brushing up. He gets forward well, but at the catch it is plain that the work is done not from the stretcher but from the seat. In other words, he catches by lifting with the shoulders and body, and lastly the legs are straightened out, apparently more with the idea of getting the knees out of the way of the oar handle than for any other reason. Stroke has a very good reason, no doubt, for his style of rowing, and he would justify it (if he were in a position to do so) somewhat as follows: He would start with the idea of first making sure, and then going ahead. That is, first get hold of the water and then go ahead with the rest of the stroke. Or to express it differently, he wants to be sure that his oar is buried and holding, or even starting the boat before he uses his legs. He knows that if he starts to use his legs by pushing against the foot braces or stretcher before he has caught the water, he will stop the boat, because he and the crew behind him in all probability outweigh the boat they row in, and should they start to drive the legs down before

the oars were anchored in the water, the boat would be pushed astern, or at least perceptibly stopped. The idea of first making sure, — of not rowing a stroke until he has made sure of catching or getting hold of the water with the oar, — could n't be improved upon. It is in the working out of that idea that our number Eight missed the point. Looking again we see that he is, as it were, putting his oar in the water with the movement of his body and shoulders, instead of reaching for the water with his blade as he comes forward. Stroke needs to limber up in the shoulder joints; he must *increase the angle between the arms and the body as he comes forward to the full reach*. He must exert less downward pressure on the handle of the oar in coming out on the forward swing, and when he has reached the end of that swing, he must remove all downward pressure on the oar handle and let the blade drop in of its own weight. Then he will have made sure of having hold of the water, and the sooner he follows up this getting hold with a long pull, a strong pull and, best of all, a pull all together, that is, legs and back together, the more effective will his rowing be and the less of jerkiness and forgotten leg drive will there be. There will be less of sore knees and more of honest leg-tired feeling, too, if he will take the initiative and drive the legs down before they get in the way of the oar handle. His catch will be quicker, *Practical Rowing 4* here he formerly depended on the snap up of the back from a motionless slide he, in catching from his foot braces, add to *the* of the back, the speed of the slide, and *the* add to the speed of the boat *try to row the whole boat yourself, " Seven. " As a matter of fact, we might say the whole Stern Four. They are all pulling hard, as if their lives depended on it, or as if they wanted to get it over with.*

*Number Seven is a long-bodied man with rather short legs, and, as is quite usual in such cases, he has been economical with his development, devoting his training to the shorter half, with the result that his thighs and legs are very powerful, while the trunk and arms have only a moderate development. There is no trouble here about the legs getting down out of the way as in number Eight's case. Seven is slamming his legs down hard at every stroke, but he has set too fast a pace for his body to follow. He is using a comparatively short slide. This is natural enough because his legs are short. To make up for the shortness of slide he is swinging a little further forward and back. And it is in the swing that the body gets behind. At the catch, could we see but the legs, we should say that Seven was a remarkable man, but we notice that the body is unable to hold what the legs*

*"the wing ee but the legs, we should say I «„ld remarkable man, but we notice tat Seven wa » able to hold what the legs that the body'*

*Kicking Out The Slide. Page 41. Legs almost down; shoulders not started. A common fault.) because where he formerly depended on the snapping up of the back from a motionless slide he will now, in catching from his foot braces, add to the speed of the back, the speed of the slide, and incidentally add to the speed of the boat.*

*"Don't try to row the whole boat yourself, number Seven." As a matter of fact, we might say this to the whole Stern Four. They are all pulling hard, as if their lives depended on it, or as if they wanted to get it over with.*

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*Kicking Out The Slide. Page 41. Legs almost down; shoulders not started. A common fault. ) undertake to drive. The body and shoulders are left behind at the catch and don't begin to hold or pull back till the legs are almost down. The slide moves faster than the shoulders on the catch. Seven is "kicking out his slide." He is "biting off more than he can chew." But he is not disheartened yet and, if we may continue the simile, we see him toward the end of the stroke give a convulsive move-*

*ment, which may be likened to swallowing, and with a jerking in of his arms he finishes with his oar in the pit of his stomach, his body curled over it. It was bad enough to attempt too much, but the summary disposition of the overload, with the body alone, is even worse, however good the intention. Seven has heard Stroke asked to use his legs and he takes the hint to himself, and with what result? Not only is his oar anchored out at the full reach, but his shoulders and the upper part of his trunk also stay there, and as the slide drives back and the body sinks lower in the boat, he is in a weak position, when at last the body is able to rise, after the legs have been driven down. I speak of the body's rising in the boat after being pulled down by the oar and may add here, that, as it is the object in rowing to get ahead in a horizontal plane, every up and down motion of the body is a waste of energy and a hindrance to the boat. For when Seven lifts his body as he must do before he carries it back to the finish, he makes himself just so much heavier during the time of the lift; he makes the boat just so much heavier or deeper in the water. He makes the boat displace more water — have more wetted surface and consequently increases the friction and retards the progress. And now before we leave Seven we must reiterate what we first said to him about not trying to row the whole boat. We may very properly caution him about jerking with legs at the full reach and with arms at the finish. He must remember that a chain is no stronger than its weakest link. If the legs are stronger than the back, the legs must give way a little and on its part the back must work a little harder, so that it may not be all concession but rather a leading up to a full application of power on the part of both body and legs. The one in leading must not be hopelessly far ahead and the one following must not hang back or try some other way separate and distinct from that which the leader is pursuing. Sympathy there must be. Sympathy to anticipate or to assist, to unite or to strengthen the various efforts made, and to make in-*

timate and ally the parts of the human mechanism, eliminating any complexity or difference, the loopholes through which faults creep in. Take it a bit easier, Seven, carry through from full reach to finish a handful of oar all the way, a handful, not a handful at the catch, two fingers' worth in the middle, and a wish that you had three hands at the finish. Get the shoulders on and don't lie down at the finish; and we turn to number Six. Before watching number Six, however, we may have noticed an inclination on the part of some of the men in the bow to take off their sweaters; whether in anticipation of being called upon to row or to display physique, we cannot stop to analyze. Suffice it to say, that there is no camera about, nor can the coach stop to feast his eyes on a fairly well-built number Two or a muscular prodigy at four. The writer remembers that the most perfectly built man of his acquaintance was asked to try for a crew; and this Herculean Adonis was quite hopeless and slow and altogether unfit for the quick changes of direction that are demanded of the oarsman. None of the Bow Four may come under this category, but in order to avoid getting chilled it is of importance that those who are not actively rowing should keep covered, particularly during the spring or fall rowing practice.

It is better to be too warm than too cold. A chill caught on the river will work much more detriment to the candidate for a crew than will the exhibition of his physique benefit or increase his chances of making the eight. And if by reason of being caught with his sweater on he has to row a fairly long stretch and loses, say a pound or two, he will make up that loss in a meal and be as well or better for it. On the other hand, if he catches cold he lays the foundation for many other troubles, which impair not only his value in the crew but his general health.

Number Six, don't swing round your oar, keep your body opposite the stretcher, and let the hands and arms connect you up with the handle of the oar, whether the handle is over the keel or over the side of the boat. This brings

up at once the question of whether the best pull is not at right angles with the oar. The oar being pivoted swings in the arc of a circle. Should not the body follow the example and swing in a similar circle to enable the pull to be always at right angles? And right here we must choose between following the oar and what may be called following the stretcher.

That which is of prime importance is power, other things being equal. To maintain power a strong position is necessary. The strongest position is that in which the body remains in a perpendicular plane, passing between the heels and extending parallel with the keel; that is, the body with the shoulders and legs should be made to keep opposite the stretcher in order that the maximum of power may be had from them. If we are to maintain this maximum of power, the arms must do the adjusting. In this way the power itself is left unimpaired by any leaning from side to side. The human engine will work better, longer, and more satisfactorily the simpler its mechanism and movements are. If the position at the full reach, where it is manifestly impossible to pull at right angles with the oar, is not ideal, then the body and legs must be kept in an ideal position to make up in quantity or power what they lack in quality or in the directness of application of that power. The arms, from the catch to the time when the legs are almost down, are little more than straps,—straps rather than connecting rods, because they must have more than the freedom of movement allowed by a pivot. There is the perpendicular movement of the catch, and then the horizontal descending movement while the legs and back are moving.

Some explanation of a horizontal descending movement may be necessary just here. The best idea may be gained if we stand erect, with both arms extended to the front and raised so that the angle at the armpits is the same as the angle at the full reach in rowing. Now, instead of moving the body as in rowing, move the arms, the hands being on a level and four inches apart, until the an-

gle at the armpits is the same as in rowing just before the arms break for the finish of the stroke. This movement in relation to the body will be a perpendicular one; but there is another, a horizontal move to the left, demanded of the arms, and the one that we have just been commending to number Six's attention. He has failed to get the horizontal arm movement and has in consequence been swinging round his oar, or, as we said before, keeping his body opposite the handle of his oar instead of opposite his foot braces. His arms have had the stiffness of connecting rods with but one joint, rather than the suppleness of straps with a sort of universal joint. If Six were to go through the movement outlined above, his body would move horizontally to the right or left according as he had a port or starboard oar.

The principal thing to be noticed is, that in the rowing, care must be taken to have the shoulder muscles loose and the joints there able to take care of the horizontal descending motion, which, in the boat with the oar, is a horizontal arc. It is not as if one had to begin or finish the stroke with the hands off keel. At the full reach the hands are directly in front of the shoulders, and at the finish the same is true. With two ends to tie to and the keel for a guide, when, in the middle of the stroke the tendency to lean is uppermost, number Six should find no difficulty in keeping upright and steady in his swing. In acquiring this over-the-keel habit it will come much easier if the stroke is rowed with but little power for the time being. When the feeling and assurance of having acquired this knack comes, then the power may be gradually increased until the full power stroke is rowed.

Five, steady down on your slide. You are rushing out to the full reach too fast. In fact, if Five were not one of the strongest men in the boat he would be in a fair way to have many other faults, resulting from lack of control of his slide in recovering.

Some people hurry because they are late, others because they fear being late. Five, we will say, is afraid of being late, so, directly he gets his oar out after the

finish of one stroke, he thinks only of being ready for the next stroke, and out he comes on his slide like a young avalanche. He has the goal in view, and the means of getting there on the slide are so obvious that he does not realize what effect his quick rush forward and sudden arrival at the end has on the boat. His quick stop is a push toward the stern and opposite to the direction in which he is trying to propel the boat.

There are three parts to the recover. The nearer we get to the stretcher or the boat itself the more care has to be exercised. Arms and body start the recover, but have little or no effect on decreasing the speed of the boat, and may even help the speed, if started sharply enough. It is not until the slide begins to move forward, not until we get right down to the stretcher, that the ways and means of stopping have to be considered. As soon as the slide starts, however, we must think of stopping, must feel for what is going to stop us, must feel the stretcher with the feet more and more as we slide out toward it. To use a different expression, we must "let ourselves down easy" as we come forward towards the full reach. The weight of the body as it comes more and more on the stretcher must be distributed throughout the recovery. The sooner the distributing process begins the less will be the kick astern as the body arrives at the full reach.

#### Time

Stern Four, let her run; get your sweaters on. Take her up, Bow Four, is now ordered. Mind your time, Bow and Two. Number One and Two are rowing by themselves, as if there were no one else in the boat.

Faults in time are always to be corrected as soon as noticed, and here is where the coxswain should keep a careful lookout, for he can see the oars at all times, though he may fail to see errors in the inboard work of his crew.

Number Four, let your elbows come in close to your body, not out at right angles. Number Four has never tried pulling himself up to his chin on a horizontal bar, or, if he has, he forgets how he did it, or how his arms adjusted

themselves for that effort,— how the forearm was always perpendicular to the rod or bar on which he was chinning himself. This is almost exactly what he is doing in the boat, only here he lets his elbows swing out until the forearms are almost in line with, or parallel to, the oar. While Four is working this out for himself and practising in the boat, let us see just where the mistake of this arm movement comes in.

First of all, rowing is pulling an oar, not pushing it. That is, the oarsman is working behind his oar, and he gains nothing by getting round in front of it with his outside hand, just before the finish, and pushing the oar in to his body the last three or four inches by a contraction of the biceps muscle alone. As to the other arm, its inability to get in front of the oar dooms it to a pull along the shaft in the direction of the oarlock. But we have seen, or if we have not seen we can discover by experiment, that when we have a heavy lift, as in pulling ourselves up to a rod, or to a ring, or in lifting a heavy object from the floor, we lift with the forearm in line with the direction of the lift; that is, the forearm will be perpendicular for an up and down lift. In rowing, the lift, so called, is tipped over on its side and becomes a horizontal lift or a pull, and the same holds true as regards application of power. The forearm is a strap with a hook on it from the time the oar is covered until the oar handle comes in to the body. To make the outside hand climb round the end of the oar and push the finish of the stroke in to the body while the inside hand presses the oar against the button is to lose much in effectiveness of the finish.

Without entering into a detailed consideration of the muscles used in the latter part of the stroke, we may say that the most important are the biceps, which flex the arm, the trapezii, which draw the shoulder-blades back toward the spine, and the latissimus dorsi, which draws the arms inward and backward. Our number Four is using his deltoids overmuch on the finish, and in so doing has lifted his arms out from behind the oar, complicated muscular ac-

tion, and has detracted from form as well as substance at the finish of the stroke.

Furthermore, the shifting of the hold on the oar at the finish throws more work on the inside hand when it comes time to lift the blade out of the water. In fact, if we watch number Four closely, we shall see that his outside hand loses hold of the oar entirely, just after the finish of the stroke. The whole

Strong Position On Full Reach, *Page 51.*

*Knees in line with shoulders and feet.)* matter of lifting the blade clear of the water and carrying it forward in the "shoot" is thus thrown upon the inside hand with its decreased leverage and consequently diminished control.

In the days when the tholepin was in use it was customary to caution the oarsman to keep an outward pressure with the hand nearest the pin in order to keep the button on the oar close against it. This practically resolved itself into an injunction to row with the outside hand and recover with the inside hand. And while this idea still underlies stroke and recovery with the modern rowlock, the inside hand should act as pilot and adjuster of feather and bevel in conjunction with the outside hand and not alone.

Number Three, keep your knees close together on the full reach. The knees should never be further apart than the width of the shoulders. Their being nearer together than this depends somewhat on the build of the oarsman. If he be stocky he will probably be more comfortable at the full reach with his knees apart than he would with his thighs pressing against his stomach and interfering with his breathing. Number Three will not go far wrong if he opens his knees so that they will be in a plane, which shall pass through the length of the foot and the shoulder-blade or armpit. This position is the one naturally taken by most people when they squat down, and it has the further advantage of preventing the body from falling too far forward on the full reach. At the same time it allows the lower part of the body a comfortable space for its



reach.

It must be remembered that the whole body is to reach not merely the shoulders. It is important for the breathing that *the stomach should not be drawn in to interfere with the downward expansion of the lungs*. A man who allows his knees to fall apart so that they rest almost on the gunwale of the boat at the full reach has, in nine cases out of ten, first to clap his knees together before he can drive his legs down. The most evident inferences that can be drawn from number Three's position on the full reach is, that he did not use his stretcher in his recovery. If he had used it he must have kept his knees closer together to support his weight as he came out to the full reach; for we notice that before he drives down his legs, or puts weight against his stretcher, there is a preliminary gathering in, if we may so call it, of the knees, in order that he may apply his power in a straight line or in one plane.

We spoke about the thighs being more or less of a support for the body on the full reach. They define the limit of a strong full reach position beyond which the body must lose effectiveness, *drawn in. Deep breathing impossible. Thoroughly bad position at the order "Ready." Slide reach neglected.*) because it drops down into the boat, and the little additional reach gained is more than offset by the extra effort required to lift the body up before it can swing strongly back. We may leave Three for a time, then, with the injunction not to row either knock-kneed, or, at the other extreme, bowlegged, but rather to toe out, as it were, with the knees, keeping them from six inches to a foot apart at the full reach.

Number Two, you are slumping at the finish. Hold your body firmly back and feel your stretcher at the finish, just as you do at any other part of the stroke.

Any part of the stroke or pull through is performed from the stretcher, and therefore the finish or end of the stroke must be executed from the stretcher also. The finish or end of anything is as much a part of the thing itself as the beginning or middle. At the finish of the stroke the body should stay firmly

back as the hands are drawn in, so that the connection between the hands and the stretcher may not be impaired by a slump or yielding of the back. Slumping usually results from a change of pressure on the oar just before the finish, and might be called, "over-finishing." It is not unlike the slip of the driving wheel of a locomotive. The remedy is the same — "sand," and the even application of power.

Number One, or Bow, keep your hands nearer together. You want one hand on the end of your oar, and the other just far enough from it to allow room for the body between them for the finish of the stroke.

If Bow should try to pry a stone out of the ground with a crowbar, or if he should attempt to draw a nail out of a board with a hammer, he would n't have to be told to apply his power as far away from the fulcrum as possible; and yet, there he sits with one hand two or three inches from the end of the oar and the other hand halfway to the rowlock. He has a lever and a fulcrum and that which corresponds to the stone or the nail. The oar is his lever, the rowlock his fulcrum, and the water is what corresponds to the stone or the nail. The only difference is that his object in rowing is to move the fulcrum, instead of the water. In either case he needs all the leverage he can get, if he is going to do effective work. It would seem, then, that the two hands ought to be close together at the very end of the oar if his pull is to have the maximum of effectiveness.

Suppose we watch Bow with his hands close together, first on the full reach, or, if we can't see him, try it ourselves. Extend the arms straight out in front, hands closed, palms down, thumbs together, and discover that this position tends to cramp the chest. Then try hanging by the hands from an overhead support, and observe where the hands naturally take hold, and see that they are about as wide apart as the shoulders. In these experiments we have been considering or studying our own convenience, but if we apply it to the theory of the lever, we find that having the hands wide apart is not good doc-

trine. But there is one more thing to figure on, and that is on the side of our convenience, and also on the side of effectiveness; namely, the necessity of having room between the hands at the finish of the stroke for the body. If this room is not left, the hand nearest the fulcrum or rowlock will have to be pulled in across the body and move in line with the oar, instead of at right angles to it.

One more reason for keeping the hands but four inches apart is that at the full reach the inboard end of the oar is the point farthest from the body, and if both arms are to be straight, while reaching to unequal distances from the body, it will be impossible to keep the shoulders squarely opposite the stretcher if the hands are wide apart. About a hand's-breadth between the hands on the full reach, a level wrist on the outside hand and a bit of arching to the inside wrist is an adjustment which leaves the shoulders almost equally forward and the body squared away for the stroke.

### III. THE COXSWAIN

Up to this point we have only commented on the work of those who are rowing, but there is one of the crew who is an important factor. It is the duty of the coxswain in the stern to be eyes for his crew, and a mentor to correct not only evident errors in time outboard, but errors in feeling inboard. The most common wrong feeling that the steersman can have, resulting from something which he cannot well see from his position in the stern, is a tendency to fall towards the bow of the boat as the crew comes to the full reach. He would bump his head against stroke's oar if he should yield to the impulse which he feels at the forward reach of his crew. If our coxswain analyzes the cause of this, he will first see that he falls forward because the seat on which he sits has suddenly moved backward, or at least that the onward progress of the boat has been suddenly checked, while he tends to keep on moving to the front. The crew then has stopped the boat, as it has come to its full reach, between strokes; that is, the crew is rushing out to the full reach with but one idea,— the idea

of getting there, and never mind how. It is easier to tell the crew to slow down its slides than for the crew to do it; and in order that the coxswain may realize some of the difficulties which he will later labor with the crew to obviate, he should, at his first opportunity, get into a steady sculling boat and learn to manage the oars or sculls for himself.

More important than the rowing for a steersman is his careful study of the way a light boat is acted upon by oars. He should note that the stern of a boat is the part that moves in turning, and that the bow is the pivot. With these points to be picked up in his spare time by himself, we must counsel the man with the tiller lines to use his rudder sparingly. If he is to change the direction of his crew, so as to bring it round a curve, he should begin before he gets to the curve to swing his stern away from the projection he is to pass, and in general get his boat round into the new direction.

In applying the rudder to accomplish this, he should time his rudder strokes with the oar strokes of the crew, rather than carry his rudder on continuously; that is, he should begin to put the rudder on as the crew gets hold of the water at the catch, and leave it off as the crew finishes the stroke. In this way he imposes no handicap on the crew between strokes, and turns the boat while the eight oars are in the water supporting it; for, if the rudder is kept on steadily until the turn is made, between as well as during the strokes, the problem of keeping the balance of the crew is decidedly complicated. The boat is now moving in a curve, but the bodies of the crew tend to keep on in the original straight line, or, speaking more technically, tend to go tangent to the curve. This tendency is met, during the stroke, by the support of the oars in the water, but when the support is withdrawn during the recover, between the strokes, the tendency of the boat to roll off keel, away from the direction in which it is being turned, results either in a very sloppy, off-keel recover on the side away from the turn, or, if the crew has tried to counteract this tangential lurch by leaning in with the bodies, the chances are that they will

overdue the leaning and roll down on the side towards which they are turning. In either case the result is far from beneficial to the speed or temper of the crew, however effective it may prove in getting the boat turned in the new direction.

#### Turning Around

There are unquestionably times when a heroic use of the rudder is necessary, where stress of circumstances demands that a sharp turn be made, either to avoid some obstruction or to get round a sharp bend in the river, made more difficult by reason of a strong current. The latter reason for using the rudder continuously is hardly to be considered seriously, for the coxswain should know his currents before he leaves the float, or at least, if he steers a crew on tide-water he should know whether the tide is ebbing or flooding, or whether it is slack water. It requires hardly more than a glance from a bridge or from the bank of the stream to take in the conditions and direction of tidal flow. An understanding or a knowledge of such items will save a deal of steering in the course of an afternoon's row and may save running aground, or into bridge piers, or missing a landing at the float.

There is an easy and a hard way to turn an eight or a four oared boat round, where there is a strong current, or in fact where there is any current; as, for instance, in the upper tidal reaches of the Charles River above Cambridge. We will take two cases. In the first we will suppose that the crew is rowing down stream with a following current and it is desirable to turn about. The boat should be first steered into mid-stream, or into the strongest current. Then by means of the rudder and by having port row, the bow of the boat is swung in towards the bank where the current is slack, while the flow in mid-river swings the stern round down stream and helps turn the boat.

In going against the current and turning, the boat should first be steered into slack water at one side of the river, and then with rudder and oars, the head of the boat should be swung out into the current to be helped round by it. In both

these manoeuvres it should be remembered that it is the stern of the boat that moves most, in nearly all cases, so that when possible the stern of the boat should be in a position to benefit by any advantage in flow of the current, as in turning from going with the current. At least, the stern should have as little to work against it as possible, as in the case of turning from going against the current. These points, simple enough in themselves, if followed out, will save time and effort to the crew, and will also relieve the boat itself of no small strain and rack.

Having reminded our crew of some of the more common faults in inboard work and posted the coxswain on what is expected of him under ordinary conditions, we may turn around and head back to the boathouse. On the return we shall consider the outboard or blade work more particularly, and when possible show how faults inboard are reflected in the outboard work.

The coxswain in turning the crew round should be considerate enough to let each side do a part of the turning. If he turns to starboard, the port oars should row the boat until it is about at right angles with the original course, and then the starboard oars should hold and check the way of the craft and back water until the boat is completely turned. *The steersman must be careful to have his rudder straight and his rudder lines drawn taut when the crew is backing*, otherwise the rudder is liable to break from its fastening. If the rudder does get away from him while the crew on either side is backing the boat, he should, provided there is room, stop the crew and have one or both sides take a stroke or two until he can get his rudder straight. It is easier to correct a fault at once than to row back without the rudder and take the risk of breaking the boat at bridges or at landing.

#### IV. OUTBOARD WORK

With the Stern Four rowing, it is noticeable, first and foremost, that the blades are not going into the water together. Number Eight's oar is coming out before anybody else's; Seven is late in catching; Six is exploring the depths

and has just missed the bottom of the river with his blade; while Five has a sort of skyscraping action at the first part of his stroke and fails to get down to the water until half-way through.

*Eight*, you are rowing your oar into your lap. Let the hands come through at the same level all the way from the full reach, and have the finish high enough on the body to allow the hands to drop down and shoot away without touching the thighs on the recover. As it is, *Eight* is finishing in the air instead of holding his grip on the water cleanly through to the end of the stroke. He must remember that the finish of the stroke is just as much a part of the stroke as the middle or beginning, and as such it must be in the water. Don't work quite so hard on your finish for awhile, *Eight*. Let the oar float in to your body and note at what height it comes. Now begin to *make it* come in at that height easily, at first, increasing the draw with the arms as you get more into the swing of it, until you can carry a full firm pressure from beginning to end. *Seven*, you are slow in getting hold of the water, and this comes partly from your tendency to kick away your slide, which we were working to correct when we started out. Get the shoulders on sharply, and turn round at the full reach with more life. Stop gathering, in that gradual fashion, and catch the water sharply and decisively. *Seven* puts his oar into the water as if he were reaching into a basket of eggs and did not want to break any. An eight-oar is too quick in the water to allow of the first part of the stroke being made soft or easy. The change of direction, the getting hold of the water, must be quick, and the catch must be faster than the motion of the boat. It is not right to start behind and figure on catching up with and giving a final boost to the boat at the finish. Keep ahead; pull the boat up to you; don't pull yourself up to the boat. *Six*, don't chop your oar in at the full reach; drop it in. Give the oar its weight on the full reach and it will drop in quickly enough, if it has been given the proper bevel just before it is ready to go into the water. *Six* is rowing his oar in at the full reach as if

he had to break through some thin ice with his blade before he could get at the water. As a result of this chopping in, the oar goes down much deeper than there is any need for, and when, at the end of the stroke, he wants to get it out cleanly, the oar is so deep that it is hard to get it clear without lifting a good deal of water and pulling the boat down in consequence. *Use your spoon oar as if it were a spoon*, number *Six*, and not as if it were an axe. Scoop hold of the water out at the full reach. Get down somewhere near the water as you come out to the catch. *Do your rowing in the cream, don't get down into the skim milk*. Do as little up and down work as possible and save your energy for the horizontal effort. Make the stroke and recovery, as far as the path of the blade goes, as near parallel as possible. Remember that the boat is to be moved horizontally, and to do this power must be applied horizontally. Every up and down movement, therefore, not absolutely essential to getting in and out of the water should be avoided.

Clipping *Five*, don't clip. Get your blade in where you reach. Raise the hands as you get forward and feel for the water. Don't turn round, — don't change your direction in the air. Make your full reach mean something. You only stop the boat by missing the first part of the stroke, for on the catch or turn round you only push against the stretcher — that is, against the boat — until the oar strikes the water. This is a push in the wrong direction and stops the boat when you ought to be pulling it along. Get your oar into the water as part of the recovery, not as part of the stroke. As a matter of fact, the getting in is not only the end of the recovery, but also the beginning of the stroke. It is therefore doubly important that this point should have careful attention and be thoroughly understood. Instead of bearing down with the hands and carrying the handle of the oar toward the bottom of the boat after the oar passes over the feet, lighten the pressure of the hands. Keep level. Hands up, head up, shoulders up, everything moving out on a level, not down.

### Reaching Something

As reaching carries with it the idea of reaching an object, what could be more useless than for number *Five* to reach forward three or four feet beyond his objective point? If he is going to clip, why reach so far? Let him decide at what point he will catch the water and only swing to that point. Here, at least, his stroke will be effective, — what there is of it. And if it does not seem as effective as it should be, he has only to decide to have the point at which he will get his blade into the water a little nearer the bow of the boat.

The *Stern Four* now stops rowing or paddling, puts on sweaters, and the *Bow Four* "takes it up." *Four* you are letting up on your finish. Keep a good handful of oar way in to the body. Keep the water piled up in front of the oar, a "heaping spoonful" and low behind, so that the blade will come out clean. Keep the elbows down, and let the pull with the arms come straight in by the body. It is the firm, hard, clean finish that sends the boat running between strokes. Don't jerk it in, *Four*. Feel at the finish that the pull in of the arms keeps the feet firmly against the stretcher until the hands shoot away on the recovery. The arms, as they bend for the draw in to the finish, must keep the feet as firmly braced as when, earlier in the stroke, they were but the straps or connecting rods which attached the oar to the body.

*Three*, take your oar out of the water before you feather it. You are *feathering under water* and dragging the water up with your oar. The blade should be lifted perpendicularly out of the water in the same position that it occupied when being rowed through, and, when clear of the water, feathered and carried along horizontally out for the next stroke. Feathering under water (see

The Finish: A Strong Position. *Page 66.* (See also plate facing page 54.) plate) is probably more productive of what is called crabbing, or catching the water with the forward edge of the oar on the recovery, than any other single fault. By lifting the blade out perpendicularly at the finish before feathering it, we are simply recognizing a fact from geome-

try, — that a line from a point to a plane perpendicular to the plane is the shortest distance between the two, — and, conversely, in applying it to the present discussion, the shortest and quickest way to get clear of the plane of the water is to go straight up from it. The reason for taking the shortest cut to get away from the water is pretty obvious, for at the finish the boat is travelling at top speed, and one cannot be too expeditious in getting the oar blade where it will not retard the progress of the boat. *Two*, you are "cutting under" with your blade. See that your oar blade is straight up and down before you begin to pull. You are leaving a little of the feather on your oar, and your oar goes in obliquely instead of perpendicularly. To get the greatest effective push out of the oar, without either lift or drag, the blade of the oar must be vertical and the push against the water horizontal. If, as in *Two's* case, the oar is rowed with the slant, the upper edge of the blade being nearer the bow than the lower, any application of power horizontally will cause the blade to cut down into the water, because the balance of the blade has been destroyed. In his endeavor to prevent the oar from cutting under, he must apply his power at right angles with the blade. In other words, he must pull down on his oar, and this pulling down acts to pull the boat down, because it is a lift of the water. *Bow*, clear the water on the recovery. Take your blade out clean at the finish and carry it well off the water until you are ready for another stroke. *Bow* has perhaps the hardest position in the boat to fill, but that does not excuse his shuffling his oar along over the water on the recover. Let him think of the oars of the boat as legs, and the blades of the oars as feet, and let the crew lift these feet and walk the boat along, taking care not to drag them between strokes or steps. We want no carpet-slipper shuffle on the recovery, — either in the water or out of it with the oars; no half-way work.

#### Making A Landing

Coxswain, you have a strong wind behind you and a little current under your boat. You had best run by the float,

turn round, and make your landing against the wind and current rather than with it. In this way a more gradual landing can be made and the risk of running into the float at too great a speed avoided. With a frail boat, too great care cannot be exercised in landing. A broken bow or a bent outrigger must not be chanced when a little more time and regard for conditions would have prevented the accident.

#### V. ALL EIGHT

After a sufficient time for practice in a steady boat, or in a light boat made steady by having only one four row at a time, the crew arrives at the stage where it must try "a stretch all eight." The time has arrived when the individuals in the crew must begin to blur, and a larger individual, the crew unit, must be evolved. For the first time we may start the crew off with the Bow Four rowing, and then have numbers Five and Six join in, and presently, when the Bow men get used to increased quickness of the boat, let Stroke and Seven fall in with the rest.

The first thing outside the unsteadiness and tendency to roll to be noticed is the quickness of the boat in response to power applied, and the failure of the crew to apply its power quickly enough at the beginning. That is, the boat must be caught quickly and dropped quickly at full reach and finish respectively, otherwise she will be stopped by the oar blades backing water at the beginning and end of the stroke. Quickness must not be mistaken for power or strength. Quickness or agility are not at first associated with great strength; in fact, great strength more often than not impairs agility. With a lively boat running under the crew, the changes of direction at the full reach and finish must be quick and snappy as compared with the more deliberate stroke and recovery just preceding the change.

Get a little more life in that catch, everybody. Don't row any harder, but get what power you put on quickly, — more life in it; and remember that a baby has life as well as a Sandow. Don't try to row harder until you are all sure that you can make every ounce tell. It is

well to build up the substance of rowing on the skeleton of form. Some, however, prefer to call form the mould and then proceed to coach substance, as we may call mere physical strength, into it. There is one difficulty, however, that will be found in this latter method, and that comes from the greater strength of one part of the body as compared with another part. Suppose that the legs are very much stronger than the back, and that instead of making the whole muscular system ease up so that the back can do its work and get strengthened gradually, that is, insisting on form from the start, and building substance up on it, — instead of building up, we try to force form upon a would-be oarsman. His strength will push his slide away ahead of his back every time, and he will presently find it difficult to realize that he is persisting in a fault, and for no other reason than that he or his mentor do not recognize that a chain is weaker than its strongest link. I say weaker than its strongest link, because the natural method of progression is a positive one and from weakness to strength. In this chain one of the links may be called the back, another the legs, and if we are not desirous of getting the cart before the horse, we shall start with some act that the back is perfectly able to accomplish; something that is more nearly a going through the motion, — formal rather than substantial. Thus, with gradual increase of work the weaker link becomes accustomed to progressive effort. Underneath all this there is a knowledge of what the right thing is, a knowledge that has grown logically, a knowledge which makes the man do the right thing naturally.

Very often one sees the man who has had form, as it were, pushed down over him, maintain a fairly respectable showing, but directly the restraint is removed he falls back into all the old faults. In the human activities, as in the human body, we find that plan which builds a substance or body upon an interior skeleton or form is a most satisfactory arrangement. Those exponents of the external skeleton, the snail and the tortoise, while probably adepts in shells,



are but slow coaches and poor models at best, for even a scheme of rowing.

While on the subject of life or liveliness in the stroke, it is worth while to emphasize this point as an important part of practice rowing at all times. We suggested a few lines back that a baby has life as well as a Sandow. The one simply suggests life or liveliness, the other stands for a fully developed physical life. We have had what corresponded to this in what was called "paddling," and what is still so called in English rowing, as distinguished from rowing with full power. In paddling there was practice, form, life, a sort of playing at rowing, rowing for the fun of it, yet with an object, the acquiring of skill and the getting together as a crew. In rowing, you left out most of the fun and got down to work, but along the same lines as those followed in paddling. If, to use another simile, we thought of an Adonis paddling, we must think of him as developing into a Hercules when the word came to row. The distinction between these two degrees of rowing is one worth bearing in mind. After a crew gets pretty well together, they should practise paddling and rowing alternately, a longer stretch of paddling being followed by shorter, snappy stretches of rowing, care being exercised to have the decided difference one of power only. For, after all, paddling is but the preliminary canter, and the crew should be given foretastes of what is expected of them in their race, as soon as they get shaken together enough to keep their boat on keel.

You are rushing the slides, all eight. Spend less time sitting on the sliding seat and more time standing on the stretchers. You are slow in starting the recover, first with the hands, then with the body, and last with the slide. As a result there is little else for the crew to do but to make up for lost time, with a dash for the full reach.

Make your dash early, when the speed of the boat is at its highest, and get the feeling firm in mind, that in starting the change of direction,— in starting the recover, — you will use your toe straps not to help you get back

to the full reach, but to start pulling the boat up to a point where you can get a full reach. It is not enough to pull the boat along during the stroke; there is three times as much momentum in the crew as there is in the boat, and this should be used to help the boat along at the beginning of the recover. A shell eight is not a passenger boat at any stage of a race, either during the stroke or while the crew is recovering, and it is a mistake for any crew to turn passengers on the recovery, as if to watch the effect of a stroke while coasting out on the slide for another try. There will be weight enough on

Taking Off The Feather Preparatory To Beveling At The Full Reach. Page 75.

(See also plate facing page 78.) the slide to bring it along out to the full reach, try as you will to keep yourselves on and in the stretchers. The instances of a free running slide being left behind at the start of the recover are not numerous and need cause the crew no concern.

#### The Stretcher

In the rowing, as in almost everything worth doing, we want a fundamental idea or principle to go by, something to tie to, as the expression is; and we have that as soon as we get into the boat, — the stretcher, — and we tie to it, and then, as like as not, go to rowing and forget all about it. Here again is where the beginner in rowing needs more of the "baby" idea in his work. He must remember where his feet are and why they are fastened in. These items seem so rudimentary as hardly to be called for here, and yet if we tell the crew to take off the feather of the oar as the hands pass over the feet, few in the boat will give evidence of knowing where their feet are in relation to their hands. The expression "taking off the feather," above, refers to the turning the oar blade from being parallel with the water to a position perpendicular to the water, ready for the next stroke. The idea in feathering the oar is to avoid the resistance that the perpendicular oar blade offers to the air. It is in line with the whole scheme of the recovery to steal

a march on the boat, to get ready for another stroke without hindering her progress. Reference has been made to the construction of the oar at the point where it rests in the lock. It will have been noted that one side of the oar, where it is in contact with the rigger or lock, is flat. That flat side is parallel to the plane of the blade. It is the flat side that may be called the working base of the oar. That is, the flat side is the side on which the oar is made, or intended to rest for the larger part of the time that it is in motion. There is, of course, no question as to the use of the flat side of the oar during the stroke, unless we consider the occasional oarsman, who finds the round corner convenient to enable him to reach downward toward the bottom of the stream. The flat side, then, during the stroke is pressed firmly against the forward side of the rowlock. The forward side of the lock is so adjusted that it allows a straight horizontal pull to keep the oar blade just covered. It is evident that during the stroke there is no question that the flat side of the oar is the working base and that this flat base is perpendicular. During the stroke the weight of the oar and the strength of the oarsman in pulling it through have been acting horizontally. In fact, we may say that the dead weight of the oar in the lock has been practically nil. But when the stroke is finished and the oar rests in the lock, and is there carried until the beginning of the next stroke, it should again rest on its working base. This base should now be horizontal, and the oar blade feathered, so that it will require less effort on the part of the oarsman to push it forward to where it is to catch the water. It will also require less lifting to keep it from touching the water during the recovery.

#### Wind Resistance

If we presume that a crew is rowing on a day on which there is no wind, that crew will be moving at a speed of nearly twelve miles per hour, which means that they must resist a wind blowing twelve miles per hour. The difference in the amount of resistance offered by the oars of an eight when feathered and when