

# MOONLIGHT BAY '75

By Sandy Hunstman

Memory is selective; we tend to remember the pleasurable and unusual and to forget the unpleasant and common. The details of the '75 North American Championships have somehow slipped my mind and have been left to the reporting by others. Certain events and circumstances, however, do offer themselves for my recollection.

For sheer beauty, I doubt that any spot can rival Hilton Head. After crossing the causway and passing by a couple of miles of "It looks just like any other sharecropper's area," we came upon quiet palm shrouded streets and beautifully kept greens. Our appreciative mood was altered slightly as we spent a half hour standing in line to get our reservations. This rankled as after my service years, I had sworn that I'd be damned if I'd ever stand in line again. But, shortly after, with buoyed spirits, as we set forth for the staging area and resumed rubber necking and enjoyment of the scenery.

"Hey, look, I remember that hole from television." Hilton Head is undoubtedly a golfer's paradise, though, much of this is lost on one who long ago decided that golf and sailboat racing were mutually exclusive. It was, nonetheless, an unusual experience to pause with the morning's first forkful of crisp bacon halfway to my mouth as I spied a golfer no more than twenty yards away just off our patio simultaneously spanking a ball hopefully toward the green and digging a hole in our front lawn. Looking up again, while speculatively munching my bacon, I stared eyeball to eyeball with the young lady as she finished replacing her divot, smiled, and waved goodbye.

Following directions correctly, one of my few triumphs, we arrived at the measuring site. Measuring was smooth and swift thanks to our hosts from the Savannah Yacht Club. For the first time ever, I had something underweight, my mast. Joining several others, I placed a trailer hitch ball in the mast bottom. I wonder if I can use this as some sort of excuse during the hot stove time.

Before setting off to get our sails measured, we parked our boat. I doubt if I'll ever again park my boat on a golf green. I think many of us spent the week alternately inspecting the greens for damage and listening for cries of fore.

While waiting for our sails to be measured, I was pressed into service as a measuring assistant. It was a pleasure to work with Randy Brooks and his fine crew. Actor's Equity would be proud of many performances rendered by skippers with marginal sails. Everyone should try measuring sometimes just to get the feeling from both sides of the fence.

How many times did we each do the 220 degree end run around the harbor as we made the trip from the launching area to the bulletin board area and back again. I think I must have met myself coming back twice.

The opening cocktail party offered a fine opportunity to renew old acquaintances, swap tall tales, and make grandiose predictions. I readily recall the acquaintances, the fine hors

d'oeuvres, but somehow am totally unable to recall any predictions I might have made.

Everyone should win something, and I did. Our District Commodore appointed me his official representative in his absence affording me an opportunity to attend the governing board cocktail party at John McIntosh's house. The excellence of the hors d'oeuvres didn't quite match the beauty of their house and both were overshadowed by their generous southern hospitality. Duncan Hines has been duly notified.

Perhaps no discussion of Hilton Head would be complete without some mention of its most interesting native residents, the crocogators (for one unable to tell one saurian from another, this seems to cover both possibilities). My attention was first called to one by a cry of "Hey, look! That's a funny la-la-log. It's an alligator." I couldn't pass a pond or waterhole thereafter without looking for another one; there were several. It's a wonder I didn't drive into a pond and join them with my attention drawn from my driving.

Not being too familiar with a crocogator's home life and travel arrangements, I was somewhat worried about where else we could expect to meet one, and how large it might be. Naturally, my mind was somewhat eased when I read in a Hilton Head broadside that they try to remove crocogators when they reach six feet or are reported as troublesome. I was also able to find that they do wonders for keeping down the canine population. I couldn't help but wonder what might happen if some over six footer happened to slip through the screening arrangements.

As interesting, though certainly not as dangerous as the crocogators, were the porpussys which we saw frolicking no more than twenty yards from our tow both going out and returning. Some sailors still haven't been convinced that they weren't sharks which may account for the fact that only one boat tipped over all week.

Some of my mathematical friends informed me that we spent more than sixteen hours towing to or from the sailing area. I can't vouch for this, but I do know that I managed to get four good naps, read two mysteries, and ride out one rain storm.

Looking through the rectrospectroscope tends to instill humor in situations where it was originally lacking. Today it is easy to see the humor in the situation as Fred Vorwerk left the deck of Alan Ruiter's boat and sailed through the air after their tow struck a concrete piling on the way out of the harbor. I've always maintained that boats near the end of a tow should keep their rudders in the water to be able to steer much like the rear steer of a long firetruck.

I don't believe many of us got over our almost pathological thirst which resulted from our underestimating the sun's heat on the first day out on the ocean. We always figured that a quart of water was sufficient and begrudged the weight that

this added to the boat. After the first day, no one worried about the weight, only about enough water. In addition to a gallon of water, we carried a quart size block of ice which didn't last long.

What an ominous sound Calibogue. The first day's practice race hardly prepared us for the Calibogue Sound Race. It seems that too many of us overcompensated for the tide and sailed frequently sideward, often backward, and too seldom forward. Seeing some top sailors from the blue fleet beside us was like comparing hangovers - nice to have someone in a similar position, but really no compensation. The entire race seemed like hitting oneself over the head with a hammer because it feels so good when it stops.

When all is finally said and done, the 1975 North Americans will probably be recalled as the year of the moonlight sailing. Few of the young at heart, and aren't all Lightning sailors, would consider a moon navigational rather than inspirational, yet how much more difficult it would have been finding the dock without it the two nights we finally tied up after 9:00 p.m. The dock was certainly welcome, but not the mosquito welcoming committee. It seemed that 16 oz. of beer attracted 4 oz. of mosquitos.

Yes, many of the nonsailing events of the '75 North Americans were memorable. Now, next year if my stopwatch is correct, my mast weight is correct, I figure the tide correctly, and everyone else isn't quite so lucky .....



**The Harbor on Hilton Head**

Photo Credit: Ellen Horan, Yachting

## THE SAGA OF THE OVAL MAST

By Djoerd Hoekstra

In the March 1974 issue of *Flashes*, Bob Seidemann and John Eggars chided the Lightning class for standardizing on an aluminum spar with the same cross section as the wooden mast, which led to unnecessary expense, without any improvement in strength, aerodynamics, or weight. They recommended that the class develop a grooved oval section without jumpers, without taper, and that special measures be taken to control the one-design character of the new mast in the future.

Actually, by that time the wheels had already been set in motion. Bruce Goldsmith had tested an oval shaped Star class section in the Red Flannel Regatta the previous fall. Both a Star section and a Thistle class section were tested during the Southern Circuit and in May of 1974, Bob Smithers published in *Flashes* the results of tests he had conducted for fore and aft flexibility of several different alternatives (figure 1). Bob explained then that the objectives were: "... to develop a strong, rugged mast that is much less prone to damage and failure than our present aluminum mast, and has a modern oval shape, good flex characteristics equal to or better than our present mast, a tunnel slot for the mainsail bolt rope, is simpler to rig and de-rig, and is less expensive." He added: "We would like to make this new mast more uniform from boat to boat and thus more interchangeable in case of mast failure or replacement and more one-design in its racing performance. This may seem like too much to ask but I feel we are 90% there." He then thought on the basis of his experience at St. Petersburg, that the Thistle section would be quite suitable for the Lightning.

Only a month later, in June 1974, Bob published further test results—this time, on the sideways tip deflection of the various masts (figure 2). He reported that the Thistle section performed well in all conditions, particularly well in heavy air, and that he wouldn't know whether to make it stiffer or more flexible if asked to modify it. The Measurement Committee then proposed that Article XII, Section 1 be amended to legitimize the oval mast:

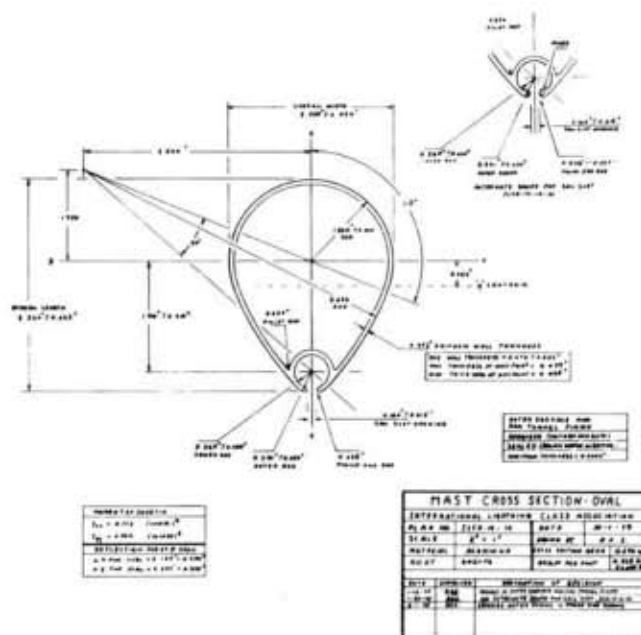
"Mast is to be hollow and rectangular or oval in section as per plans . . . All hollow aluminum masts must be foam filled . . . All oval section masts must be uniform in cross section throughout their entire length, and rigged without jumpers." Target date: March 1, 1975, subject to approval by the Governing Board and the IYRU.

Some mixed feelings surfaced at the Annual Meeting held that August at the Cleveland Yachting Club. After Bob Smithers presented the Measurement Committee's recommendations, several speakers cautioned that we were moving too fast. It was feared that anyone who wants to sail competitively with the hot shots will have to get an oval mast and that not enough time had been allowed for development. Others who had used the mast experimentally, spoke in favor of the new mast, stating that it would not improve boat speed but would

save perhaps \$100 on each mast, would increase interest in the boat, and help the class grow in countries other than the U.S. Subsequently, the Governing Board gave the proposed change its blessing, and so did the IYRU in its November meeting.

The specifications were further amended to insure the one-design characteristics of the new mast, in line with the recommendations made by Seidemann and Eggars. Article XII, Section 5 requires that the extrusion dies used for the new mast be approved by the Measurement Committee. The acceptable tolerances on the size, shape, and weight of the new extrusions are given in Plan No. ILCA M-10. These specs also include an actual flexibility test on the extrusion to determine if it has the right flex characteristics in both the fore and aft and sideways directions. This signalled a basic change in measurement philosophy by the class in that it required approval before production begins rather than after. The details of the rigging of the new oval mast are given in the official Plan No. ILCA M-20. All oval masts must be rigged in accordance with this plan if they are to be considered legal equipment. The tolerances on the position of the essential parts of the rigging are much smaller than they used to be.

The system used to attach the upper and lower shrouds makes replacing them a simple task. A standard naval eye is swaged to the end of the shroud. This fitting is bent as shown in M-20 and the hole is threaded for a 1/4-20 bolt. The eye fitting enters the mast through a slot 1/4" wide and 1 1/4" long and is fastened in place with a 1/4-20 round head screw.







The aluminum wall is compressed between the screw head and the eye, distributing the force over a large area. The screw is locked in place with "lock tight". This system works quite well and the stays can be changed in two minutes.

The Measurement Committee ruled that oval masts must be measured by a certified measurer and must have a completed measurement certificate. Paragraph 3 of Article I was amended to require a royalty of \$8.00 to be paid for each oval mast, as evidenced by a decal permanently attached to the mast below deck.

So now the stage was set, and in the couple of months between the finalization of the new specifications and March, builders and do-it-yourselfers alike had to learn a whole new game, and in the process became quite proficient with the ubiquitous pop rivet gun. And, since at that early stage, not everyone was equally well informed, quite a few rivets had to be popped, drilled out, and popped again. However, when the dust settled, most of the more competitive types were sporting one of the black beauties.

Lal Burrige was able to provide a good summary of what was involved in the July and August 1975 issues of *Flashes*, from which the following excerpts are taken:

"Lightning stepping logs, etc. come in various shapes and sizes. The new oval masts do not, they are all the same in theory. You will look at the buttplate and wonder when you have ever seen a stepping log with a rail running along its center instead of a slot. The answer probably is you've never seen one. The buttplate on the new oval mast has two rockers and a slot in between them. The mast is designed to rest upon these rockers. If you have a slotted stepping log you are going to have to devise or build a tongue which will fit up and bolt through the rockers and protrude below them and between them so as to key the mast into the slot (Lippincotts, Allens, Nichols and Holmans). Some other boats do not have either slot or rail, but have a plate with side flange arrangement (some Allens, and Eichenlaubs). On some of these boats, you will have to cut down the side flanges because they are high enough that they allow the mast to rest on the side flanges of the mast buttplate and not on the bottom rockers. The mast is designed with a curvature on the bottom of the rockers. If you have a slotted stepping log and have to affix a tongue between the rockers, make sure that the tongue is not long enough to go all the way to the bottom of the slot and rest upon the bottom of the slot. You do not want the mast rocking on the tongue. It would be a good idea to shape the bottom of the tongue in the same curvature as the rockers and then the tongue a bit shorter than the depth of the slot. Another handy tip, is to drill a hole up through the bottom of the buttplate as a drainhole. The mast will develop some moisture and water inside it from rain, condensation, etc. so make sure that that can drain out the bottom.

The buttplate on your mast has two metal rockers, as mentioned earlier. The action of these rockers upon a wooden stepping log cuts somewhat into that stepping log. We discovered this when it had cut approximately a 16th of an inch down. We recommend that you cut two strips of stainless of the thickness of approximately a 20th of an inch, 1/2 an inch

wide, by 6 inches long. Drill a countersunk screw hole at each end of each strip and screw them onto the top of your wooden stepping log on each side of the slot. In this way, the hard metal rockers of the mast will be rocking on equally hard metal, instead of tearing up and wearing down your stepping log. This also helps to explain to some slight extent the apparent stretch of new rigging.

It may be that you will have to enlarge the width of the mast partners hole in the deck. This is a grundy chore. Spread newspapers inside the boat underneath the mast partners, as it makes cleanup easier. The oval mast is wider than is any mast previously used by the class. Even if you don't have to take off enough of the glass flange to go all the way through it in enlarging this hole, as you put the mast in and take it out you will gradually burr up and tear that weakened fiberglass flange. Eichenlaub Boat Company does have a laid-up, fiberglass flange that can be inserted into an enlarged mast partner hole. This item is rather expensive and will probably need dressing and trimming to fit your boat. It is probably a worthwhile addition. When you have the hole cut out big enough so that the fiberglass extra flange fits snugly, you can affix it in using Silicone Seal and a few pop rivets. This seems to hold it excellently and is a lot simpler than messing with fiberglass resin, epoxy glue, or screws, bolts, or the rest of it.

There are things you should do before you run your main sail up the mast or out the boom. Purchase a medium size, triangular metal file. Work your way up the slot in the mast and out the slot in the boom with this file. The slots seem to have a sharp edge and an occasional burr which cuts the sail.

In addition to such burrs, there are some sharp corners. At the outer end of the boom, in the slot, there is one. This is actually a little beyond the silver band but it is possible to pull the sail out to that point and cut it on those sharp edges. We recommend using the same file to round off the corners a bit. There is an entry port into the tunnel of the mast which starts approximately 14 inches above the gooseneck and runs about 8 inches up. The bottom side of this has sharp corners, and it will nick, burr, snag, and chafe your bolt rope. Use the file on it. After you've done all of this filing, you will see a bright gleam of new metal up the slot of the mast and out the slot of the boom and on these rounded off corners. Maybe it doesn't protect the metal any, but it makes you feel better if you put something on that bright metal. We recommend a spray can of Silicone Lubricant or some of the other spray lubricants that are around. Run straight down the slot with it. It's probably a good idea to spray it on the first 6 inches or so of the bolt rope of your sail.

The first few times that you put the sail up or down, inspect it closely and see if there is any cutting going on. If there is, use the file some more. A smallish, flat metal file can be used lengthwise and at an angle to get the inner edge of the slot if that be where there is a problem. If you do start getting some chafe or cutting up near your headboard or at the clew of the main, you can patch this with either nylon rip stop tape or dacron sail mending tape. Cut off about a 2 or 3 inch length of it and put in lengthwise along the bolt rope, folding the sides over and around the bolt rope and onto the sail itself.



The Virginian in Ecuador - Don Delorme showing off oval mast.

Photo Credit: Mary Huntsman

Then with dacron thread and a sail makers palm, stitch through, right behind the bolt rope so that you are tightening the tape down and around the bolt rope. You will get it tight enough that you will begin to see the lay of the bolt rope through it. You can then run up and around in a spiral, following those grooves and really secure the patch. You then stitch out a bit from the bolt rope to tack down the edges of the secure tape patch.

If your mainsail is a new main, and was actually designed for use in this mast (and has no grommets), your problems are easier. You just snip off the bindings or plastic sail track clip holders and you are ready to go. If your mainsail has grommets you have another problem. Most sails are made so that the grommets are close to the bolt rope, and there really isn't room between bolt rope and the edge of the grommet for the lips of the mast tunnel. You can either take the file to the slot and enlarge the slot, or you can remove the grommets, or you can figure that sooner or later it will wear loose and you'll live with it being tough to raise and lower. If you remove the grommets you will be left with a series of holes running up your luff and out your foot. It may be tedious, but it is probably a good idea to cut up a bunch of square ripstop tape patches, put one on each side of each grommet hole and stitch through to hold it down. We would not suggest one long run of ripstop tape running the whole luff, as it will probably change the stretching characteristics of your luff rather drastically. The slight amount of enlargement by filing necessary to the slot to make the grommeted sail slide up and down easily is probably not so much that it does any harm to the mast at all. It is a bit tedious to have to do that much filing."

A number of trouble spots with the specs were resolved over the summer. One item that resulted in much discussion is the specification on the surface finish of the mast. Some of the finishes in use at the time on rectangular aluminum masts were judged to be worse than nothing at all, and the Measurement Committee decided to require a minimum thickness of .0007 inches which would ensure a reasonable resistance to corrosion and abrasion. When this thickness is achieved in a standard sulfuric acid bath on the alloy and temper we are using for our mast (6061-T6), then the color of the surface is quite black. The Measurement Committee stated that, in principle, it has nothing against colors other than black, but it will examine any proposed non-black anodized coat before approval is considered. The Eichenlaub Boat Company was given permission to produce a small number of masts with thinner coats as part of a test program.

The spinnaker halyard, which must be rope in the new mast, may be led through a fairlead in the front of the mast as shown in Plan ILCA M-20. These options were allowed:

The spinnaker halyard may pass through a sheave block mounted in the front of the mast or through an eye mounted on the front of the mast or through a pulley mounted on the front of the mast close to the mast. The "B" measurement is made to the top of the sheave groove in the sheave block or pulley and to the lower inside edge of the eye.

In the August Flashes, Don Delorme explained "How Do You Tune An Oval Mast?" and concluded that it was "Easy". The following recommendations are from his article:

"With the adjustable backstay and the stiffness of the mast, the exact amount of bow or bend can be placed on the mast in all conditions. Prior to this, and especially with the wooden masts, the bow was preset by the jumpers making it necessary to be weather forecaster as well as sailor. The sails look very clean coming off the section and the masts come in such exciting colors. (sic).

The mast should be blocked at the deck to avoid too much bend down low. We very rarely change these blocks.

Sailing to weather in a chop we try to keep the main as full as possible. The backstay is only used to bend the mast when we are having trouble holding the boat down or the jib begins to sag excessively at the forestay. A good trick in heavy air is to watch the crew, when they look like they are coming in for a rest, tell them a puff is coming and let the backstay off a little. They will never know the difference. In heavy air we used to work the mainsheet all the time, now we seem to do it all with the backstay. It is important if not critical to have it positioned where it can be adjusted while hiking preferably by the skipper or the main man.

Reaching in very heavy air appears to be easier if you do not let off the backstay or the Cunningham and sometimes let off the boom vang. In almost all other conditions we ease the backstay and Cunningham to straighten the mast.

I hope that you like your oval as much as we do. Just remember when you are going fast to weather don't set too hard on the white boat."

Both Lal Burridge and Don Delorme seem to agree that in positioning your new mast in the boat you'd do best to follow your sailmaker's instructions with regard to mast foot position, rake, tightness of uppers and lowers, jib leads, etc. Bruce Goldsmith feels that, since the oval mast is a bit stiffer sideways, the upper shrouds therefore do not have to be super tight to keep the mast straight sideways.

In addition to these helpful hints, I might add a few comments, having gone through the conversion from wood and a season's sailing with the new mast myself.

In my own case, I was able to use the spreader, the backstay and jibstay, and both the jib and main halyards from my old wooden mast, without any change. My old upper shrouds were shortened by a local marine supply store to serve as lower shrouds on the new mast, and the only new rigging I had to buy was a pair of new uppers and rope for the spinnaker halyard and topping lift. I am still using my wooden boom and it was a simple matter to attach it to the gooseneck fitting on the new mast.

Basically, the new masts are strong, clean, and well put together. But experience has shown that there are a number of areas which have to be watched. Lal Burridge already mentioned the problem some people have with the metal mast foot eating into the wooden mast step. If your upper shrouds seem to require tightening repeatedly, you may want to prevent further damage by using some metal strips on top of the wood, as suggested by Lal. In addition, the area of the



partners, where the mast goes through the deck, can create trouble. You need blocks fore and aft of the mast which are shaped to fit around the mast profile and have the proper angle to align with the rake of the mast. Pressures can really build up here, and with improperly blocked masts, deformation or cracking can occur, especially if the section at that point is in any way weakened by screw holes.

The third potential trouble spot is the gooseneck fitting, which in my case is attached to the mast with three machine screws. The aluminum section is quite thin, and the thread which is tapped into the mast to hold these screws can fail, or the bolts can loosen. There are a number of solutions to prevent this gooseneck fitting from pulling out of the mast. Some have strapped the fitting to the mast with stainless steel clamps; others have taken a piece of solid stainless rod with three holes tapped into it which fits inside the tunnel of the mast section, and which provides better holding power for the bolts. I am not sure you need these, but don't forget to check this fitting periodically.

Watch the rope tails on your internal halyards like a hawk. Sometimes the rope can get worn, especially if the mast is not quite properly cut out to provide a smooth fairlead where the halyard exits. The next thing you know, something doesn't go up quite smoothly, you yank on the halyard, the rope tail breaks and the halyard goes up inside the mast. Quite a job to fix that, as I found out to my sorrow, and as undoubtedly many others will. It is also a good idea to periodically check that the screws which hold the upper and lower shrouds to the mast are not loose. They are supposed to be secured with "lock tight" but funny things do happen. Don't, however, try to actually tighten these forcefully, because then you'd break

the "lock tight" bond.

Finally, inspect the area of the main sail along the bolt ropes for wear even if you have followed Lal Burridge's advice to debur the tunnel and to make sure that the entry into the tunnel is perfectly smooth.

All in all, after only one year of experience, the new oval mast must be counted as an unqualified success for the Lightning class. The objectives set so ambitiously by the Measurement Committee when they embarked on this project have been fully met. Everyone who wanted to bring his boat up-to-date has been able to convert to the new mast without too much trouble and expense, but the fears that this mast would obsolete a lot of existing equipment have not been substantiated, because I don't think anyone has been disadvantaged by not having one. President Gary Cameron summed it up for most of us when he wrote: "I have a new oval spar on my Lightning this year. It looks fine, and I am pleased with it. However, I do not think it makes us go any faster on the race course. The boats that beat us before continue to beat us."

According to Helen Limbaugh's records, close to 500 new oval masts were built during the past year and failures, if any, have been few and far between. Continual, gradual, well conceived improvements to our Lightnings are essential for the class to remain strong and growing. This change was successful because it was the right thing to do, it was fully researched, and a lot of time and effort was expended in development and testing. It is hoped that the successful implementation of this change will give us the courage to tackle other changes as the need for them arises.



PYC Sailing on Cass Lake

Photo Credit: John Scott



# WILL YOU BE IN A JAM?

by Thomas J. McDermott

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If you are a racing sailor, especially of small boats, your answer is undoubtedly in the affirmative. The reference is to the variety of jams which occurs so often at marks and obstructions. When Editor Djoerd Hoekstra asked me to write an article for the Yearbook on some aspect of the racing rules, I immediately thought of Rule 42—Rounding or Passing Marks and Obstructions. It is the most difficult rule to thoroughly understand and to comply with, particularly since it frequently requires instant decisions on situations which arise very quickly.

Consideration of tactics is omitted here to help keep the length of these notes within bounds. Careful reading of the language in the official rules is recommended together with study of the decisions on appeal which interpret and apply them. A knowledgeable and alert crew is a priceless asset to any boat before and during a jam. If a rule is not clear, demonstrate it to yourself with models.

No part of Rule 42 is operative except as to boats which are about to round or pass a mark or obstruction. Unless 42.3 on barging is applicable, no right to buoy room is given at any starting mark surrounded by navigable water. Rule 42 has no application between boats on opposite tacks until after the starting line has been cleared. It does apply before starting between same-tack boats at an obstruction including a mark not surrounded by navigable water. A boat entitled to room is entitled only to "the room needed to round or pass in a safe and seamanlike manner" and not to all the room tactically desirable. However, it is advisable for the outside boat to give the amount of room demanded and to protest if the room taken is excessive. Although not entitled to room a boat may take the room available if she does not interfere with another boat which is obeying the rules. Other right-of-way rules supplant Rule 42 as soon as the rounding or passing has been completed. Rule 42.1.

Knowledge of the official definitions is essential to understanding the rules. For example, a boat may be both

overlapping and clear astern of another in a situation often not recognized: an outside boat arriving at two lengths from the mark must keep clear of a boat having an inside overlap (under the definition) although that boat is actually clear astern of her when an intervening boat overlaps both of them. An overlap may be established at several boat lengths apart if the boats are converging on the mark or obstruction at a wide angle.

Whether an overlap exists, or does not, at the critical time is a vital question at marks and obstructions. The problem is governed by Rule 42.2 at which we will now take a look.

## ESTABLISHING AND MAINTAINING OVERLAP

When the boat **clear ahead** (on the same tack, with exceptions above noted as to starting marks, or, after the start, on either opposite tack) arrives at two of her lengths from the mark or obstruction, she has right of way over the boat astern for rounding or passing including jibing (except under 42.2b and 42.2c explained below). Rule 42.2a(i).

Also, the boat clear astern shall not establish an inside overlap and be entitled to room when the boat clear ahead (even though on opposite port tack and at over two lengths) is **unable to give** the required room. Strong wind, high waves or other circumstances can make this rule applicable, for example, when the overtaking boat is planing or when space around an obstruction is insufficient for giving room. Rule 42.2a(ii).

The restriction by Rule 42.2a(i) above on a new inside overlap from clear astern within the two lengths is cancelled if one of the boats involved has **completed a tack within two lengths** from the mark or obstruction; after such a tack, the new overlap effectively gives a right to room unless the boat now outside is unable to give the required room. For example, although one of two boats was clear ahead when she arrived at two lengths from the upwind mark, if she thereafter completes a tack, she must give room (when able) to the boat clear astern, which subsequently establishes an inside overlap. The rule has no effect at a downwind mark where neither boat will tack. This is a tough one which is sometimes misinterpreted by experts and authors. Try it on your models. Rule 42.2b.

A boat clear astern may establish an overlap between the boat clear ahead and a **continuing obstruction** (such as a shoal or the shore) only when there is room for her to do so safely. Rule 42.2c.

A boat **clear ahead** is under no obligation to give room to a boat clear astern before an overlap is established. Rule 42.2d(i).

A boat which claims an inside overlap has the **burden of proving** that the overlap was established in proper time. The burden of proof may be sustained by satisfying the Race Committee that the overlap existed at several boat lengths before the line at two lengths was reached. See also the comments at 42.2e(ii) below. Rule 42.2d(ii).

The inside boat must be given room in rounding or passing, including tacking or jibing, if she overlaps when the outside boat comes within two of her lengths of the mark or obstruction whether or not the overlap continues to exist; that is, she retains her right to room even though the **overlap is thereafter broken**, as by a loss of speed or by an alteration of course. Rule 42.2e(i).

An outside boat which claims to have broken an overlap has the **burden of proving** that she became clear ahead when she was more than two of her lengths from the mark or obstruction. This rule modifies the older rule of 42.2d(ii) above on the burden of proof in claiming an inside overlap in proper time when the existence of the overlap for several lengths is disputed. The rebuttable presumption now is that an overlap or a clear-ahead position continues to exist at two lengths if it previously existed at a somewhat greater distance. If the evidence at a protest hearing is of equal weight (a) that an inside overlap existed at two lengths and for several boat lengths previously, and (b) that the previous overlap had been broken at the two lengths, then there is no presumption and the burden of proof provided in each rule cancels the other; the result under these circumstances is that neither boat can be disqualified under either rule. Rule 42.2e(ii).

A **hail** helps to support a claim of the establishment or termination of an overlap or of insufficiency of room at a mark or obstruction as provided by Rule 35.2.

### WHEN OVERLAPPED

A troublesome sort of jam often happens when (after the start) overlapping boats **on the same tack** are about to round or pass a mark or obstruction. An outside boat shall give each boat overlapping her on the inside room to round or pass the mark or obstruction (except as provided by 42.1a(iv) on luffing to the wrong side of the mark). Such room for an inside boat includes room to tack or jibe when either is necessary to the rounding or passing. Only under these circumstances, or after hailing for room at an obstruction, can a boat have right of way while she is tacking. Rule 42.1a(i).

When (after the start) two overlapping boats **on opposite tacks** are about to round or pass a mark or obstruction, the outside boat (even though on starboard tack) shall give the inside boat room, including room to jibe in rounding, except that: when the boats are on a beat or one of them has to tack in rounding or passing the other right-of-way rules are then in effect especially the opposite-tack and tacking rules. In other words, as to overlapping opposite-tack boats (a) at an upwind mark or obstruction, right of way is the same as if the mark were not there and (b) at a downwind mark or obstruction, the inside boat on either tack has right of way for passing or rounding, including room to jibe. Rule 42.1a(i) and 42.1a(iii).

The inside overlapped boat (after the start) on the opposite tack (either starboard or port), or on the same tack without luffing rights, **must jibe** at the first reasonable opportunity if a jibe is necessary to her best course for the next mark. Rule 42.1a(ii).

An outside overlapping boat with luffing rights (after the start) may luff an inside windward boat on the same tack to

the **wrong side** (windward side) of the mark provided she hails to that effect and begins to luff before she is within two of her lengths from the mark, and provided she also passes to the wrong side of it. Rule 42.1a(iv).

### WHEN NOT OVERLAPPED

The boat clear ahead when she arrives at two lengths from the mark or obstruction (even though on opposite port tack) has **right of way to round or pass**, including room to jibe but excluding room to tack. This does not apply at the start to opposite-tack boats at a mark surrounded by navigable water. Rule 42.1b(i).

If a boat clear ahead **tacks** to round a mark she must, while tacking, keep clear of the boat astern as though the mark were not there; but the boat astern shall not luff above close hauled to prevent such a tack. Although the boat clear ahead may not be able to tack, she is not prohibited from luffing head to wind. Rule 42.1b(ii).

### ANTIBARGING RULE

The easiest place to get in a jam is at the starting mark to windward. The words "barging" and "antibarging" do not appear in the official rules although a boat unlawfully trying to force room between a starting mark to windward and a leeward boat is commonly said to be barging. Sailing between the mark and a leeward boat is not prohibited if room is available to do so without interfering with a leeward boat sailing lawfully. Rule 42.3.

When approaching the starting line to start, a leeward boat shall be under no obligation to give any windward boat, overlapping on the same tack, room to pass to leeward of a starting mark surrounded by navigable water. But, after the starting signal, a leeward boat shall not deprive an overlapping windward boat of room at such mark either (a) by heading farther toward the wind than the direction of the first mark when the first leg is a reach, or (b) by heading farther toward the wind than she can be steered with advantage in sailing to windward when the first leg is a beat. Rule 42.3.

The application of the rule is limited to one particular situation. It does not begin to apply until just before the starting signal when the leeward boat is approaching the starting line to start; nor does it apply after the mark has been cleared by the windward boat. It applies only at a starting mark to windward and is without effect at a mark to leeward of the boats concerned. It has no application except as between overlapping boats on the same tack; that is, the opposite-tack rule and other applicable right-of-way rules must be observed. It does not apply unless there is navigable water on both sides of the starting mark. It is not operative if there is sufficient room for the windward boat between the leeward boats and the mark. Rule 42.3.

### RETURNING TO START

A premature starter while returning to start, or a boat working into position from the wrong side of the starting line or its extensions when the starting signal is made, shall, until

she is wholly on the right side of the starting line or its extensions, keep clear of all boats which are starting or have started correctly. A boat on the "wrong" side of the starting line or its extensions has full rights of way until the starting signal. She retains such rights of way after the signal as against other boats also then on the wrong side. As soon as she is entirely on the right side of the line or its extensions, she regains normal rights of way against all boats if she gives ample room and opportunity for keeping clear to boats starting correctly. A premature starter shall have the same right of way as a boat starting correctly until it becomes obvious that she is returning to start. Rule 44.

### HAILING TO TACK AT OBSTRUCTIONS

A close-hauled boat clear ahead or to leeward may hail the other close-hauled boat on the same tack for room to tack for the purpose of allowing herself to clear an obstruction and the other boat. This right is upon the further conditions that safety requires a substantial alteration of course and that the tack by the hailing boat cannot be made without a collision. The hail shall be made in time for the boat to windward or astern to respond. If instead of hailing to tack the leeward inside boat bears away to pass to leeward of the obstruction, she must give the other boat room to also do so. (Rule 43.1).

The hailed boat shall tack as soon as possible (in which case the hailing boat shall also tack promptly) or reply "You tack," whereupon the hailing boat shall tack immediately. In the latter case, the burden of showing that she then kept clear shall be upon the boat so replying. (Rule 43.2).

If the obstruction is a mark that can be fetched by the

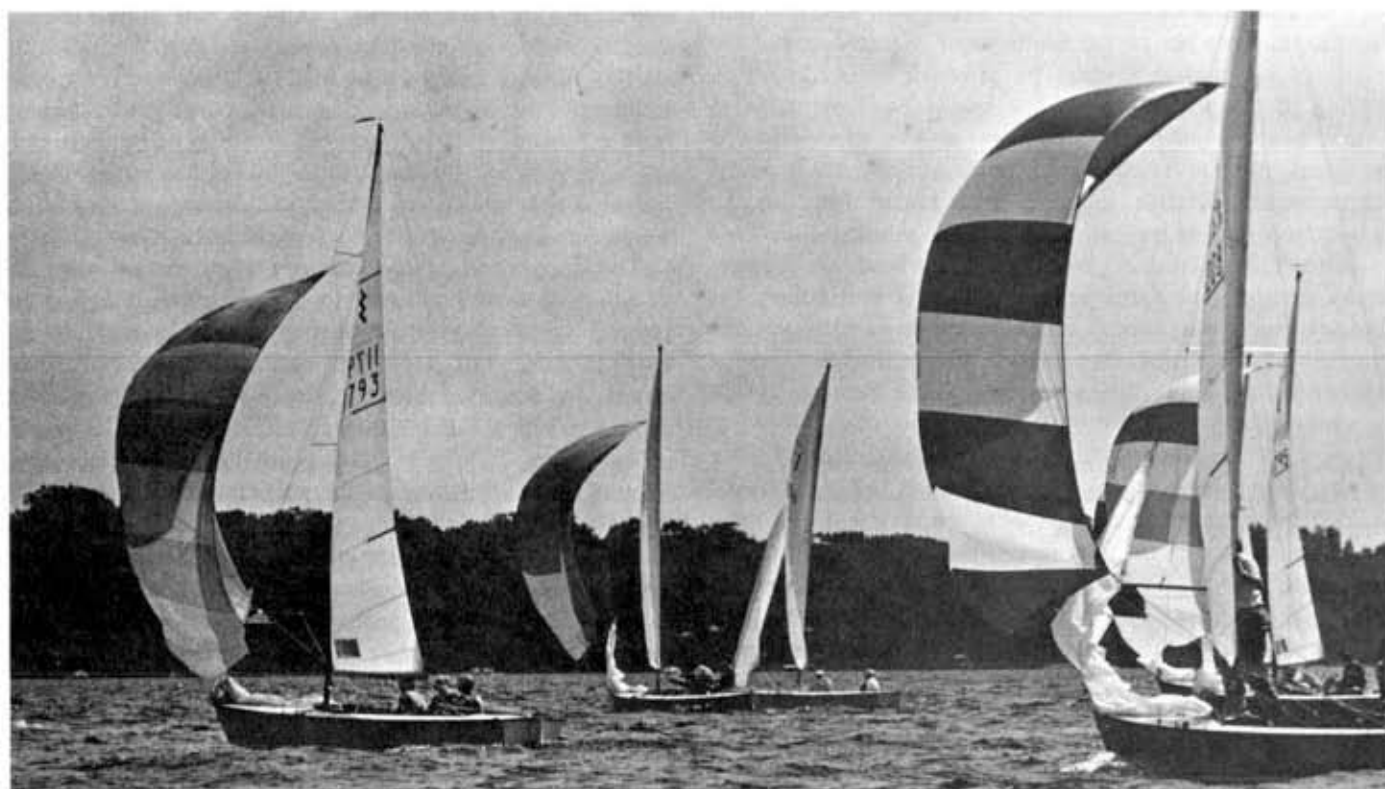
hailed boat, the hailing boat shall not be entitled to room to tack and she shall immediately be informed of this; upon another hail for room, the hailing boat shall receive it and retire. If the hailed boat refuses to tack and fails to fetch the mark, she shall be disqualified. "To fetch" means to sail to windward of an object without further tacking. (Rule 43.3).

### TOUCHING A MARK

A boat which touches a mark of the leg being sailed shall retire unless she protests for being wrongfully forced to touch it or unless she exonerates herself. Exoneration is obtained by encircling the mark once and then passing or rounding it properly. If a starting mark is touched after the preparatory signal, exoneration is done by starting after the starting signal and by then encircling the mark. If a mark is touched at the finish, the rounding must be completed and the line again crossed before finishing. The alternative penalty of 720 degree turns is never exoneration for touching a mark. Rule 52.

A boat which has touched a mark retains any right of way until it becomes obvious that she is returning to encircle it; thereafter she must keep clear of all boats which are about to round or pass correctly, or which have done so, until she has completely rounded and cleared the mark and is on a proper course to the next mark. Beware especially of a jam while you are returning to encircle. Rule 45.

We all know from sad experience that there are innumerable ways of getting into jams even while ashore. I hope that the above notes will help you to avoid or to extricate yourself from some jams while racing.



PYC Sailing on Cass Lake

Photo Credit: John Scott



# WIND AND WEATHER PATTERNS

By Bruce Goldsmith

Very few of us have a lot of training in meteorology. However, a working knowledge of some of the very basics of wind and weather patterns as they apply to the waters on which we race our Lightnings is a necessity to doing well consistently. I will break this discussion into three parts to show the different types of wind and weather conditions. (1) small inland lakes, (2) larger lakes, and (3) oceans. I have included some examples of where we will be sailing Lightnings in the coming year to give everyone an insight in how to make better decisions at those specific regattas.

## SMALL LAKES

On any given day, the wind that is present is mostly a function of whatever weather system is in the area. Except in the case of drifters or storms, we can generally expect the wind to remain roughly from the same direction for our entire race. The biggest tactical decision comes in analyzing what the topography around the lake causes the wind to do in terms of direction and velocity. Figure 1 shows that expected wind

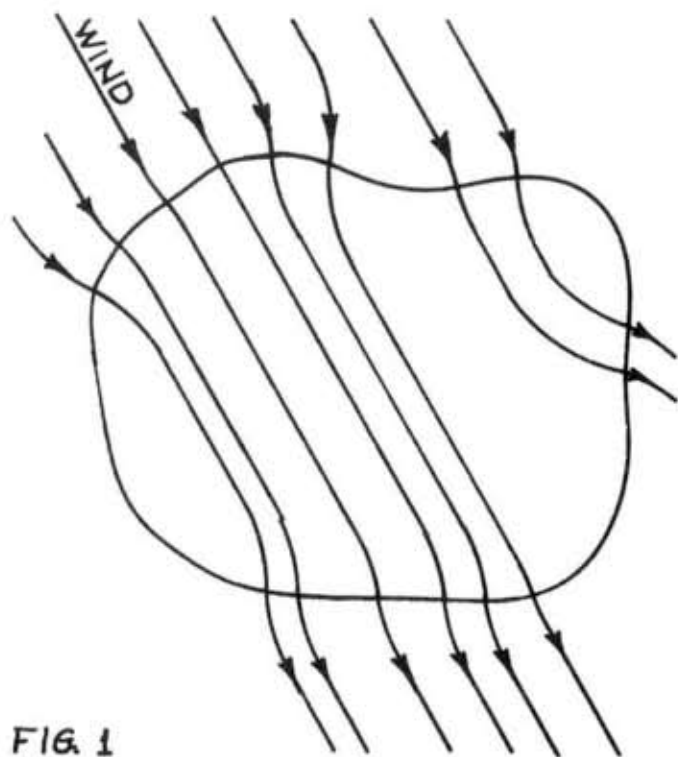


FIG. 1

direction changes across a normal small lake. Note that as a wind comes off the shore, it tends to bend more perpendicular to the shore. This can be explained by the extra resistance of trees along the shore causing the wind to slow down, and is much like the refraction of light through glass that we all

studied in our high school physics book. A heavy concentration of trees or a bluff on a windward shore will cause an area of very light wind directly downwind from it. It also sets up an area of higher pressure and creates a bouncing wind condition as the wind fills in over the bluff and comes down with a vertical component into the water a distance out into the lake. This will show up on the water as a puff, but it will not tend to move to leeward as rapidly as a normal puff, and there will always be an area of lighter air just to leeward of the bounced puff. It will be evident if you look on the water, but you have to realize that there is this possibility and be able to play the isolated area of extra wind.

On a leeward shore the same phenomenon occurs, but it normally does not effect the race because it takes place much closer to the lee shore. You must also look out for the wind lifting off the water close to a leeward cliff or batch of trees.

Certainly, you should always look for the dark spots on the water which are the small waves on top of the normal waves. If you can see the small waves, well, then these can give you the direction of that particular puff and allow you to position yourself tactically to take advantage of that angle. If you are too far away to be able to see the angle of the small waves, you can try to track the outline of the puff as it moves across the water, which gives you a mental picture of the direction from which the wind will come.

In drifters, be ready to play the shores of a small lake. Temperature differences between the land and the water right near the shore can set up a very small thermal air movement. There will be very light air blowing near the shore and a big vacuum out in the center, as shown in Figure 2.

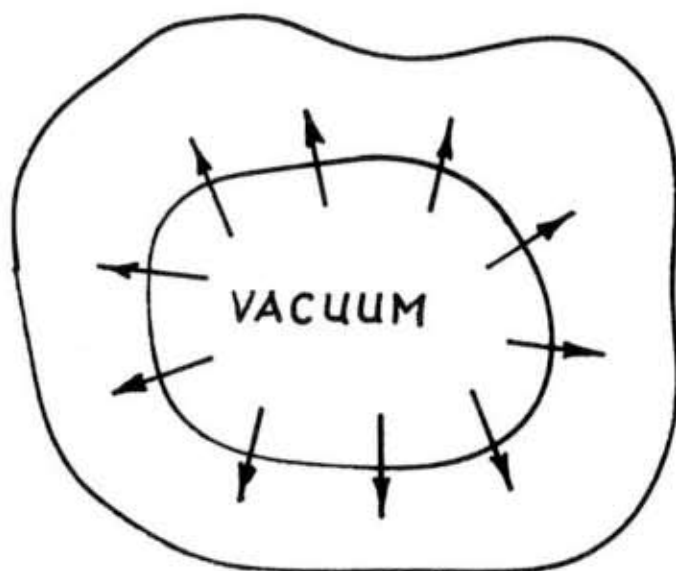


FIG. 2

## LARGER LAKES

Larger lakes would be like the Great Lakes which are typical of areas in which our North American Championships are usually sailed. Buffalo, Cleveland, Toledo, Tawas, Chicago, Milwaukee, and for the coming year Sheboygan, Wisconsin, are good examples. The wind in all of these areas is a combination of weather system wind and thermal wind. In North America weather systems generally move from west to east. Wind moves clockwise around high pressure areas and counterclockwise around low pressure areas. A thermal condition is set up when the heat of the day causes the land to heat up much more than the water-making the air over the land rise. This forces the air over the colder water to be sucked into the vacuum over the shore. This wind will be roughly perpendicular to the shore and directly on shore.

In some areas the normal weather system wind and the thermal wind line up and produce a very solid sailing breeze a good percentage of the time. Buffalo and Association Island are good examples of this situation. Chicago, Milwaukee, and Sheboygan are examples of where a westerly weather system will fight with the easterly thermal to produce what we call the light mealy stuff. However, because Lake Michigan is long and narrow in a north-to-south direction, it tends to force weather systems to give us either northerly or southerly wind flow rather than due west. A northerly weather system wind will turn into a good solid northeaster when it is thermally reinforced, and a southerly weather system wind will turn into a good solid southeaster.

To give you an idea of what to expect on Lake Michigan in Sheboygan for this year's North American Championships, all the above mentioned factors will come into play. Some of you may recognize the following specific analysis for Lake Michigan as a piece that was in the North Americans' program in 1968 in Chicago. It will all apply very well as long as we sail far enough out in the lake. Due to the fact that Sheboygan is not as big and as hot as Chicago and is farther north up the shore, there are two differences. First, the thermal effect is not as great; but when we are having a southerly flow, the funneling effect up the lake has had a chance to take effect. The second is that as you get up more into the middle of the lake, the current effect is greater. Very often there is a strong south-to-north current running. Generally, it is much weaker in-shore and even backeddying some. If this factor is in effect at the time, it can tend to override any wind shifts on a southeasterly.

Current is not usually a factor in the race, but you should be aware that a small amount of current is always a possibility. Wind moves the water from one end of Lake Michigan to the other. Usually the current will be the same direction as the wind, if the wind is strong. If the wind is light and has recently changed direction, the current may be in no relation to the wind. It may just be returning the water from yesterday's blow. The current is unpredictable, so check around the starting mark before the race. Any current should be constant over the entire race course.

Discussed below are the prime weather possibilities:

**Southwest Wind** - In two out of three years August will be

generally hot and humid with southwest winds. A large high pressure stationed off the southeast coast of the U. S. with a clockwise flow around it brings hot, humid air from the Southwest and Gulf of Mexico all the way into the Great Lakes area. This wind is, of course, off-shore and does shift in a rhythmic fashion. It blows hard from the southwest on occasion but much more in early summer than in August. Expect 8-12 mph from this direction during the regatta. It is common for the southwest flow to last three days and for the wind to increase slightly each day.

**Thermal** - The next possibility is for no wind in the morning to turn into a light easterly about noon. This one we call the Great Air-Conditioner because it cools things delightfully along the shore and on the race course. It is strictly a "sea-breeze" or thermal wind and usually runs 5-10 mph in August. Even though it is an on-shore breeze, the waves don't build up because there is no long sweep of wind from the Michigan shores. The shifts on this wind are hard to guess but are somewhat rhythmical. However, late in the day the thermal will veer (clockwise) slightly as it dies.

**Cool-Front Progression** - Probability calls for no more than one cool front during a week. If we get this frontal weather, a low to the north will shift the wind to the northwest. Following this shift, the wind swings clockwise about 45° for each of four days as a high drifts eastward behind the front. This means, of course, that the wind will veer somewhat during the races also. The first day has the northwest wind with cool, dry air. This wind is very shifty near shore but should be fairly steady out in the lake where the race courses will be.

The second day brings a light northerly. Even though the tendency is for this wind to veer gradually, you must be aware that many times the northerly varies greatly in velocity from one ten-minute period to another. As it dies it goes more easterly, and when the new puffs come in, they come from the north again. The thermal forces which are less powerful but in a more easterly direction, tend to take over during the lulls of the basic north wind.

The third day brings a northeast wind which is very steady and usually runs about 15 mph. On this wind we usually go out on port tack first because the wind is stronger and more easterly out in the lake. The wind tends to follow the isobars of pressure running east and west in open water, but near the shore friction slows the wind and causes it to cross the isobars from high to low pressure, which is swinging the wind more northerly with the high to the north. Since the northeaster can gather momentum over open water for about 330 miles from Mackinac Island, the waves are the biggest from this direction. They also tend to be more the roller type or not so close together. Boat speed and power are most important when the wind is northeast.

As the high passes to the east the wind goes east to southeast and dies on the fourth day. This can be frustrating because the rollers from the northeast seem to hang around too long. Your guess is as good as anyones in this race. You can hope for the return of a southwester.

## OCEANS

For our discussion oceans are nothing more than very large lakes. The tendency here is for the weather system wind to get completely blanked out by the thermal effects. Best examples of this phenomena were last year's North Americans at Hilton Head and places that many of us sail every winter, including Savannah, St. Petersburg, and Miami. Even though Savannah is on a river, it is close enough to the Atlantic ocean that almost every afternoon the seabreeze comes in from the southeast.

In St. Petersburg, the early morning southeasterly Florida trade winds get completely overridden by a southwesterly thermal wind. You have to take a look at the map of the area to get the full effect. It would be very easy to get the feeling that east to west would be the thermal direction because that is the direction we come out from shore in St. Petersburg. However, the big part of Florida is to your east and the big part of the ocean is to your west, making the thermal direction basically west to east. If the wind starts out in the morning in the south, it will tend to swing to the west. Once the wind is around to the northeast and if it has any velocity to it from the weather system, it will tend to swing easterly and then southeasterly again. St. Petersburg is another one of those areas where the weather system and the thermal fight each other, and therefore you usually get lighter air in St. Petersburg than in Savannah or Miami.

Miami, of course, faces southeast which is the direction in which the trade winds like to blow. Due to the weather systems, which normally occur in the area, by afternoon the thermal is usually 15 to 18 knots from the southeast because it doesn't have to fight the weather system wind.

One thing to watch very carefully no matter where you are sailing, is the formation of clouds and their expected effect on the wind. You must make a mental note in the morning of what the weather system wind is doing before the thermal effect takes place. Also, have an opinion of what the weather system wind should do from a newspaper weather map of high and low pressure areas. Most of the time, we are sailing in the thermal wind conditions of the afternoon, but a cloud cover can be a good opportunity to play the side of the race course that would be favored if the wind were to shift toward the weather system wind. This is particularly true in a place like St. Petersburg where the thermal is not as well defined. For instance, a cloud cover to the east over the larger part of Florida will very often precede a shift to the left in a southwester and give you a chance to play the left side of the beat when going to the southwest. This would be particularly true if it is the second or third beat and the right side has been favored on the previous beats. If the clouds disappear over the land to the east you can expect the thermal to take over again and swing the wind abruptly back to the right.

One last factor which is usually minor in our race strategy but does occur is the coriolis effect caused by the spinning of the earth. As the wind dies late in the day, the weather system and the thermal effects are greatly diminished and the wind tends to go to the right in the northern hemisphere and to the left in the southern hemisphere. Therefore, if it is getting late in the day and you are on the last beat and you need a miracle, take a flyer to the right if you are in the northern hemisphere and to the left if you are in the southern hemisphere. Also pray that it doesn't get too dark if this one doesn't work.



North American Champ Bruce Goldsmith in 12422 finishing the final race.

Photo Credit: Ellen Horan, Yachting