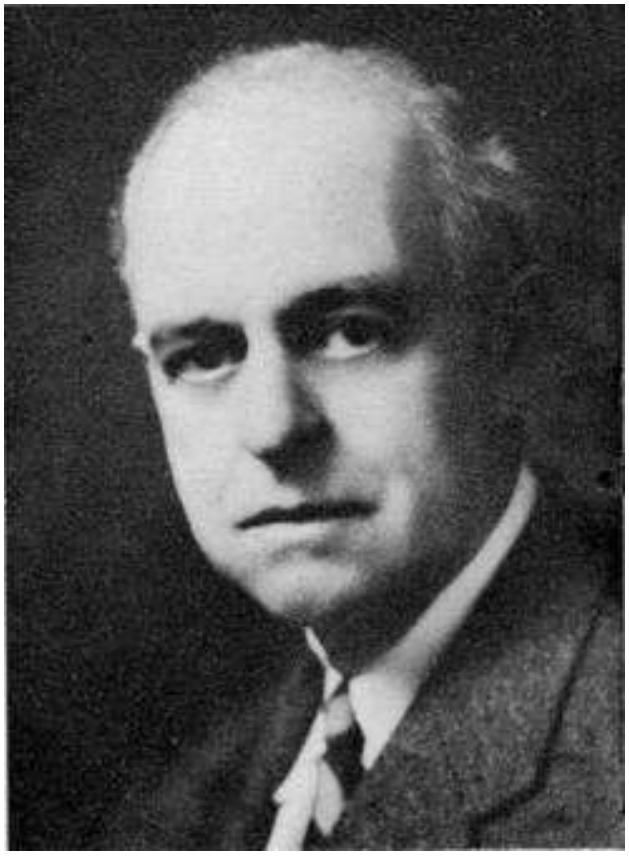
FRANCIS SWEISGUTH
1882-1970
DESIGNER AND DEVELOPER OF THE STAR

During the winter of 1910-1911 twenty-two Stars were under construction at the boatworks of Isaac E. Smith, located in Port Washington, New York and another 11 Stars, known at the time as "Nahant Bugs", were being built by Richard T. Green & Co. of Chelsea, Massachusetts. These 33 boats were the first Stars to be built. Now, more than century later with more than 8,500 Stars, Star boats continue to be built.

Here we will look at the man who not only drew the plans for the original Stars, but also supervised the two changes in the rig and sail plan, first in the early 1920's when the rig was changed from the gaff rig to the short Marconi, and then at the end of the decade when the rig was changed from the short Marconi rig to the modern rig the Star still uses today. Few of us realize how much the Star Class is indebted to Francis Sweisguth.



FRANCIS SWEISGUTH

Much has been written about the origins of the Star boat and the Star Class, for example in the past anniversary Star Class Logs (1922, 1931, 1941, 1951, etc.) and Starlights (January, 1986). For a detailed history which covers all of this material see C. Stanley Ogilvy's book, "History of the Star Class", available from the Central Office. Here we will focus in on the important role of Francis Sweisguth, the draftsman in William Gardner's Naval Architect office who drew up the plans of the Star boat.

In about 1906 George A. Corry, the ring-leader of a small group of yachtsmen from the New York City area, asked William Gardner to design a small, inexpensive chine-built arc-bottomed sail boat with a keel. George Corry was a friend of William Gardner, and it was natural for Corry to contact him to design the boat. The first fruit of Gardner's effort for Corry's group was a boat known as the Bug. The Bug was drafted by Curtis D. Mabry of Gardner's office and made its appearance on Long Island Sound in 1907. The boat is reported to have been 17' long with a keel weighing 150 lbs.

After four years of racing the Bugs in the waters about New York City the owners of the Bugs decided that the boats were too small, too wet and much too uncomfortable. A committee was appointed, consisting of George Corry, A. B. Fry, Thornton Smith and William Newman, to take this matter up with William Gardner. That was done in the early fall of 1910. This time it was Francis Sweisguth who was Gardner's draftsman who drew up the plans for the boat.

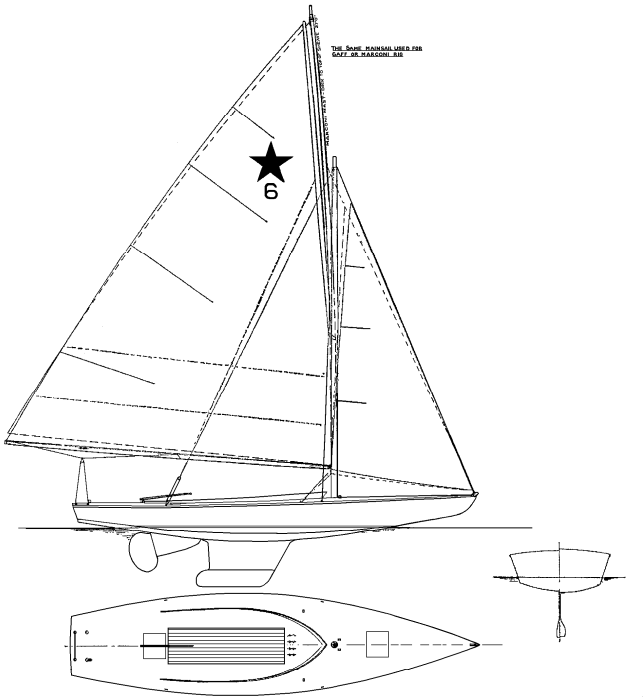
It is interesting to note that apparently by the time the boat was ready to be built it still did not have a name. In fact when copies of the plans for this new boat were sold to the Nahant Dory Club in Massachusetts for construction of a class boat for that club the name of the resulting boat was the Nahant Bug. Despite this name, these Nahant boats for some unexplained reason had red Stars on their sails. In any case, in the beginning George Corry wanted to name the new Long Island Sound class the Big Bug. Fortunately for the Star Class, Stuyvesant Wainwright of the American Yacht Club suggested the name Star as being more appropriate for the new Long Island Sound class.

During the winter of 1910-1911 twenty-two Star boats were built by Ike Smith of Port Washington for the Long Island Sound group. It is interesting to learn from the 1922 Star Class Log, the first Log put out by the Star Class Yacht Racing Association which had just been formed that same year, that Francis Sweisguth was one of the original owners of the Star Class yachts built by Smith. According to the Log, Mr. Sweisguth owned Star # 6 from 1911 to 1915.

The Star, as originally drawn up by Mr. Sweisguth, was a gaff rigged boat with a long boom, very typical for racing boats of the day. The luff of the mainsail was 24"11" as opposed to 30'6" now used on the modern rig and the foot of the mainsail was 18'4" as opposed to 14'7". As the Star Class continued to grow and develop during the late 1910's and early 1920's it became clear that the rig should be modernized. The first step was to change to rig from a gaff rig to a Marconi rig. This changeover

occurred gradually during the early 1920's. The same mainsail could be used on either rig.

The 1922 Log shows the Star sail plan with both the gaff rig and the Marconi rig. The caption to the plan states that the same sail can be used on both rigs. It is interesting to note that the number on the mainsail of the boat in the sail plan is # 6. While this is just a conjecture, it seems most probable that Mr. Sweisguth was responsible for drawing this sail plan.



Sail Plan from the 1922 Log

During the 1920's high aspect ratio Marconi rigs became more common on racing sailboats. Already by this time several Star skippers were also involved in racing bigger boats, including the America's Cup boats, so most assuredly developments in the aerodynamics of yacht sails were well known to the members of the Star Class. As a further push in the direction of adopting a more modern high aspect ratio rig for the Star there was pressure from Europe which indicated that the Class would be better accepted in Europe if it had a modern rig.

In the April, 1929, issue of Starlights, in an article entitled "Modernizing Star Rig under consideration", there is the following comment: "Though the idea of adopting a more modern rig for the Star Class is not a new one, Larry Bainbridge, D.S., is responsible for placing it before the I.E.C. in such a convincing light that it has been unanimously voted to give the project wide publicity and then place it before the next annual meeting at New Orleans… Our present rig with it's long boom is out of date, it does not appeal to the new man who is coming into the game and it will not retain the interest of the keen skipper who may be driven out of the Star Class and into classes that offer the modern improvements in sail design…."

The Starlights of November, 1929, continued the story in the article "Modern Rig Adopted for 1930": "A modern rig was adopted at the annual meeting in New Orleans by a vote of 434 to 66, to become effective March 1st, 1930…. The rig recommended by the Bainbridge Committee, which gives a boom to the transom and about the same sail area as the present rig, was adopted in principle and referred back to a Technical Committee, to be appointed by the President for any necessary refinements. This Technical Committee consists of Prescott Wilson, head of Geo. Burrows, Inc., sailmakers, Ernest Ratsey, of Ratsey & Lapthorn, Inc., sailmakers, and Francis Sweisguth, who drew the original plans and was formerly with Wm. Gardner."

Ernest Ratsey's Joy with the experimental rig in 1929

Obviously, although now almost 20 years later, Mr. Sweisguth still had more than a passing interest in the Star boat and the Star Class, and it is interesting to see that the Class included him on the Technical Committee when the decision to go to the tall Marconi was made. In as much as no direct evidence has been found one can only

speculate how much Mr. Sweisguth had to do with the development of the tall rig, and in particular the rigs experimented with on Ernest and Colin Ratsey boats Irex (#24) and Joy (#361), and on Prescott Wilson's boat. Even after the modern rig was adopted by the Star Class in 1930 Mr. Sweisguth continued to be listed in the Logs as the head of the Technical Advisory Committee until 1933.

It should be noted that at about this time Mr. Sweisguth was a partner in the naval architect firm of Ford, Payne and Sweisguth based in New York City. Mr. Sweisguth continued to design small class boats at least into the 1930's. The 18' Interlake, designed in 1932 for Sandusky Bay, Ohio, is an example of one of his later works.

In 1961, as the part of the 50th anniversary of the birth of the Star boat, Mr. Sweisguth was made an honorary Life Member of the Star Class. C. Stanley Ogilvy, Star Class editor and historian at the time, visited Mr. Sweisguth in his Larchmont home, in part to get Mr. Sweisguth's version of the history of the Star Class. Part of this interview was reported in Starlights of May, 1961. Then, in August, 1970, Starlights carried the obituary of Francis Sweisguth which read in part as follows:

Francis Sweisguth, who drew the original lines of the Star in 1911 in the office of William Gardner, died recently at his home in Larchmont, N.Y. at the age of 87. Mr. Sweisguth was the last of the "charter owners", who sailed one of the first boats in 1911. In a very real sense he was the designer of the Star hull. The smaller Bug had been designed in the same office. Mr. Sweisguth said, in an interview a few years ago, "The Bug lines were not drawn by me. When Billy Gardner asked me to do the Star, I started from scratch, without looking at the Bug lines. If the two boats looked alike, it was because the lines of all chine-built boats with an arc bottom are similar."

Further search through the Star Class archives at Mystic Seaport Museum may reveal more about Mr. Sweisguth's involvement with the development of the Star boat. However, if the above information is accurate, then Mr. Sweisguth not only designed the Star, but was the technical advisor for the Star Class during time the two rig changes took place. During these 20 years the Star boat went from having a gaff rig to the short Marconi and finally to the rig we still use today, and Mr. Sweisguth was at hand for each of these phases of development.

When Mr. Sweisguth died in 1970 the Star Class was in the middle of a technological revolution. Fiberglass boats had just become approved and aluminum spars were being discussed by the Technical Committee. Throughout the next 30 years innovation and refinement have been the guiding principles of the Star Class. One has to wonder what would Mr. Sweisguth make of his boat today, now 90 years young?

President GEO. A. CORRY, "Father of the Stars."

GEORGE A. CORRY
1863-1943
Father of the Star Class
Class President, 1922-1925
Class Commodore, 1926-1943

WILLIAM GARDNER
1859-1934
Naval Architect and employer of Francis Sweisguth

WILLIAM GARDNER
1859-1934
Naval Architect

In the 1931 Log Mr. Gardner made the following comments:

"When I designed the Star my aim was to produce a boat that was fast, handy, seaworthy, and that could be built at a moderate cost; these qualities I was evidently fortunate enough to have obtained.

"The boat alone, however, was not entirely responsible for the great success that has followed. The great interest taken by the owners of the boats and the unceasing efforts of the Association to bring to the attention of the yachting world the merits of the boats, have been in a large part responsible for the unprecedented success of the class.

"The large fleet that exists to-day is very gratifying to me and my sincere wish is that the success of the Association will be as great in the future as it has been in the past."

Ike Smith in 1907
Builder of the Manhasset Bay Bugs.
Builder of the first 21 Stars.
He built a total of 67 Stars.
His last Star, # 547, was built in 1928.

SKIP ETCHELLS
AND THE BIRTH OF THE MODERN STAR
based on conversations with Bill Buchan
and Jane Lawrence

Skip Etchells played an important part in birth of the modern Star. In college he studied naval architecture and when World War II began he went to work in Seattle in the shipbuilding industry. Because of his naval architect training Skip realized that there were allowable tolerances in the Star specifications which would allow him to build a superior boat.

This knowledge was further reinforced by the work which Phil Spaulding and Harry Hofmann did in the 1930's for their master's thesis at University of Michigan in which they studied the effects on the Star hull design by taking the boat to its maximum and minimum tolerances at given stations. They built three models to tank test the question of what the effects on hull speed would be by so doing. Phil, who had set up a naval architect business in Seattle, became acquainted with Skip during the early war years and passed onto him the lines from the most efficient hull in their experiment. As Phil Spaulding noted in a recent interview, this hull was mark by a wider bow and a flatter contour than was normally built into the Stars of the time.

In 1942 Skip and his friend Bill Kelley built the first Etchells Stars, # 2125, Shillalah and # 2127, Hell's Angel, in which he applied these principles. They began construction on these boats first on Mercer Island in Seattle and later finished them off in the Madison Park garage where the Puget Sound Star Fleet housed their boats during the winter.

It is perhaps appropriate here to take a look at the question of tolerances which were allowed in the building of a Star in the wooden hull era. The specifications as they came from Gardner's office in 1911 gave exact numbers. For example, the over-all length was given as 22' 7" and the beam as 5' 8". It was expected that there would be builder errors and in the beginning this was not an area of concern.

However, in the 1925 Log there appeared for the first time an attempt to limit what constitutes builder's errors. It is quite apparent that there was considerable sloppiness on the part of builders up until January 1923, when, according to the 1925 Log, these new limitations on dimensions were drawn up. For example, the length over-all in the revised specifications was given as:

"22 feet, 7½ inches. A variation of one inch over, or four inches under, allowed in all boats built prior to January, 1923, and 1 inch under or 1 inch over allowed in all boats built after January, 1923."

Four inches under on pre-1923 Stars??? There must have been some pretty short Stars sailing around in those days!

In the 1930 Log a Table of Limitations governing variations in hull construction first appeared. These limitations were not altered for many years. In the 1941 Log the following are the limitations which Skip Etchells had to work with when planning the construction of his boat.

TABLE OF LIMITATIONS
HULL

	Allowed under	over
Length over all, from point A	1/2"	1/2"
Half breadths at deck and chine, at section 6 and 8	5/8"	5/8"
Half breadths at deck and chine, at section 3 and stern	1/2"	1/2"
Frames, position from correct center	1/2"	1/2"
Contour lengthwise of keel plank at each station	1"	1"
Contour athwartship at each station	1"	1"

Contour measured from base line, with the exception there must be no concave lines in the bottom anywhere.

What is most noticeable in these limitations is that the bottom contour of a boat can be 1" over or 1" under at any station. Obviously this gives 2" overall if one uses a moveable base line, making it possible to flatten out a boat by dropping the ends 2". Based on the information which Phil Spaulding passed onto him, the concepts which Skip used in building his boats were to make the bow as wide as possible under the rules, thus making the boat full in the ends, while at the same time flattening out the boat fore and aft.

It is worth mentioning that aside from making the boats constructed using this technique faster, especially off the wind, having full ends also made the boats much more stable. Bill Buchan remembers that at the 1954 North American's sailed in Rockport, MA, the competitors rafted their boats each evening because there was no haulout of boats. One day it happened that his boat was rafted outside #2125, sailed in that series by its new owners Daniel and Brian Catlin of the Great South Bay fleet. Bill had to hop from boat to boat to get to the dock, and when he landed on #2125 he knew there was something very different about the boat. It felt more like a battleship because it was so steady.

Of course it didn't take long for builders, professional and amateur alike, to realize that they were being left behind by Skip's innovative boats and to begin to try to imitate the boats which Skip was building. Bill, for example, built his own boats, starting with #2830 in 1949. Although he tried to incorporate Etchells' concepts in his boat, still even with his third boat # 3328, the first Frolic, he hadn't incorporated the wide bow at station 1 which the O.G. boats had. When he realized that he missed this point he did major surgery to Frolic in 1956 to correct the situation.

When the war was over Skip married Mary O'Toole and move to Greenwich, CT. He took a job in New York City with the naval architect firm of Sparkman & Stephens.

According to Jane Lawrence, Skip was not happy doing the daily commute into the city, so after two years of working at S&S he established the Old Greenwich Boat Company. To get him started John Hazen White invited Skip to use a small shed and carpentry tools on the White estate. White also owned Rocky Point Sailing Club and wanted Skip to build a fleet of Moths for the club. This got Skip started with a nice order. Later came an order from White for Lightnings. By 1948 word got around that Skip would build you one of those super Stars and orders started coming in. By 1956 O.G. Boat Co. had outgrown the White facilities and the operation was moved to Stamford, CT.

Skip & Mary Etchells in one of Skip's creations

Skip was forever tinkering with the design of his Stars. O.G. Stars were designated by model letters. By the late 1950's the model designation was "D", or if chromed hardware and bleached deck were part of the deal, "Super D". The last boats to be built by O.G. in 1970 were designated as "G". In that year the rights to the hull design were transferred to Duplin Marine in Winthrop, MA, and Joe Duplin began to build fiberglass O.G.'s using an O.G. model "G" hull as the plug for his mold. About model differences Bill Buchan has the following observation:

"Joe Duplin once told me that Skip was really surprised that my boats, which were much wider than his at stations 2 and 3 on the chine and narrower than his at the deck at those same stations, were successful. He experimented with moving the volume of the boats nearer to the ends by deepening the keel profile at stations 2, 3 and 4 as well as 7, 8 and 9. There were some boats built with what I would call a "pumpkin" shape as compared with the more successful "V shape". I would think that he felt that the rounder athwartship section would be better in light winds as it should reflect lower wetted surface. Whether it worked out that way or not I can't say. I will say, though, that a model that was called the "F", one of which was sailed by Joe Burbeck in the summer of 1962 on Long Island Sound and later in the World's of that year in Cascias, was about the fasted shape that I ever saw Skip turn out."

One of the hallmarks of the O.G.'s was the quality of workmanship which went into the boats. Top-grade red cedar was used throughout most of the boat. In the areas which took the most stress however, namely the keel plank, keelson, and the ribs which held the keel mahogany was used. Also unique at the time were the decks of O.G.'s. Unlike the other builders who used wide red cedar planks, usually 6" to 8" wide, the O.G. decks were constructed out of 1 5/8" wide red cedar planks which were shiplapped. On the topside of the plank there was an 1/8" gap between planks which was filled with Thiokol (black rubber). As a nice touch the center deck king plank was mahogany and mahogany was also used around the cockpit edge. The deck was bleached before the varnish was applied, giving the deck a straw-yellow color. All these extra details made the O.G.'s somewhat heavier than the Lippincotts and Eichenlaubs, but a quick glance through the recent Star Class Logs shows that there are more O.G.'s still in service from the wooden boat era than there are Lippincotts or Eichenlaubs. As a recognition of the quality of the O.G.'s the Old Greenwich Boat Company's ad in the Logs would often carry the by-line "Built like a yacht", this as opposed to the Eichenlaub by-line which read "Fine light spars and hulls". The extra weight which an O.G. carried, which was really was only about 50 lbs., did not seem to make the boats any less competitive, and O.G.'s still won their share of races. One of the lightest Stars ever built was Tom Blackaller's Eichenlaub # 3938, which is reported to have weighed 1,340 lbs. In the October, 1965, Starlights the weight of each boat which competed in the 1965 World's is given. The winning boat was an O.G., # 4831, which weighed 1,423 lbs. Next was an Eichenlaub, # 4749, which weighed a surprisingly heavy 1,457 lbs. Third was a Buchan, # 4913, which weighed 1,383 lbs.

One of the big controversies during the 1960's was the question of V-bottomed boats. The Table of Limitations included the words, "Section of bottom to be true arc of circle." The Eichenlaubs got to the point where the V-bottom was carried right to the stern making it obvious that the thwart-ship bottom frames were not true arcs. The O.G.'s were much more subtle in this respect. The frames themselves were relatively true arcs, but the keel flange was faired by building up extra thickness fore and aft and on either side of the keel. The resulting effect was something approximating a V-bottom, at least in the area around the keel. At the height of the controversy about the bottoms of many Stars not being a true arc Skip Etchells proposed a toast at a Star dinner "To Noah, the builder of the only true Ark."

Skip & Mary Etchells with Commodore Rafael Posso after winning the 1950 Mid-Winter Silver Star / Cup of Cuba

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From time to time Skip would contribute comments to Starlights. One of the more amusing is about halyard locks aloft. Hard to imagine today, but there was quite some controversy over having halyard locks. Skip commented:

HERE WE GO AGAIN
by E.W. Etchells
(From page 3 of the July, 1953, Starlights)

Just had an excellent idea for a few of our brethren who can't stand halyard locks: get a screwdriver and take 'em off! Then please let the rest of us use ours in peace. We've had them for years and they work fine.

That's all - except for the taker-offers who like a limber mast and have them pared down just about so. In these cases have a spare ready - a little fatter than before. And if we are all forced to remove our halyard locks, how about letting the proposers of this legislation guarantee to replace, at their expense, all the broken spars which result? Because there will be lots and lots of them.

Most everybody had heard that halyard locks reduce the column load due to halyards by one half. But unless the latch taker-offers want to run the downhaul end through an illegal hollow mast or a series of fairleads, they will have another problem, namely, eccentricity increase as the mast bends and makes like an archer's bow. The wire seeking the shorter straight line is not relieved as the sheave gets closer to the deck. The headboard drops and automatically maintains the bowstring tension.

Mast failure due to this difficulty is fun to watch - from another boat. It creeps up slowly at first, then faster, and ends with a bang. At least, so it was before halyard locks.

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SKIP ETCHELLS
By Skip Allan

Skip and Mary Etchells were my childhood heroes. Even though I lived in California I got to know about them because I read everything about Stars I could get my hands on. I didn't get to meet them until 1959, when Skip and Mary came to Newport Beach to race in the 1959 World's, and I was their designated boatboy.

Over the years, I had two Etchells Stars. Number 3497 was an Etchells "C" model, and # 4497 was an "E." Number 3497 literally landed at my feet transom first. Its previous owner and crew were short-tacking up the Newport Beach shoreline and a big wave carried it ashore stern first while I was standing there spectating from the beach. The transom was crushed, but our family bought the boat for salvage and Gerry Driscoll did a beautiful repair job.

By 1962 Mary Etchells had retired from crewing for Skip. He needed a crew and called me up. I was 16 at the time and weighed 125 pounds, 100 pounds less than Skip. I flew to Portugal and crewed in the 1962 World's in Cascais with Skip. We did well in the big breeze, despite my light weight, and came third in the World's. Dick Stearns and Lynn Williams won the Gold Star that year with their Etchells "D" model, and the Russian team came second in another Etchells boat.

The Russians had Skip Etchells incensed, as they were clearly using hiking aids, illegal at the time. Skip protested, and we had witnesses. But Class President Paul Smart disallowed the protest, partly to avoid an international "incident." I came away from the World's with a healthy respect for Skip Etchell's attention to detail, as every night he would tweak on his sails. He was also a good tactician, as was evidenced by the Gold Star on his sail.

Skip Etchells' starting techniques were rather unique. All Etchells Stars, beautiful in their own right, came with a mahogany drawer aft under the tiller. I finally got to see what this drawer was intended for when crewing for Skip at Cascais. He carried his stopwatch in that drawer, and as we approached the starting line, he would continually open and shut the drawer to check the time left on the stopwatch!

Old Greenwich Stars, built by Skip Etchells, were the most beautiful wooden Stars ever built. I sincerely hope someone has kept at least one of them.

Stan Ogilvy's Flame, O.G. Star # 2700, crossing the finish line in the fourth race of the 1948 World's at Cascais

The editor's O.G. # 3855, Siren, with John Rumsey up front. Still sailing after all these years, 45 in all.

THEY DON'T TACK LIKE THAT ANYMORE

Back in the "good old days" of wooden boats and wooden spars many people carried the boom about a foot off the deck when going upwind. There was thus plenty of space for the skipper to scoot *over the tiller* when tacking and many of the top skippers did just that.

While reviewing Star Class films for Mystic Seaport, in part so Mystic will know what is on these films and in part to find clips which would make for interesting viewing for a film loop which they plan to make for the Star Class exhibit, there are various examples of people tacking using this method. For example, in the video of the 1961 World's Championship during the last race there is a view where as Bill Buchan tacked he scooted over the tiller rather than going under it. Going further back, in the film of the 1950 World's held in Chicago shows that Skip Etchells also scooted over the tiller while tacking. Apparently the same was true for Lowell North in the 1949 World's film, although that was not as clear.

Bill confirmed that indeed many skippers did scoot over the tiller while tacking in those days, but of course that came to an end when the booms began to be carried lower to the deck because it got to the point where there was no room to squeeze through the slot between the boom and the tiller.

Skip Allan made the following comment about tacking using this method:

"Most of the good sailors in those days went over the tiller, although personally I went under. I definitely remember Skip Etchells going over the tiller, and I remember Don Edler and Bill Ficker doing the same.

We didn't carry as much rake in those days. I was average, and the outhaul end of my boom was about a foot off the deck when close-hauled. I think it was the SF Bay sailors who first discovered rake was fast in a breeze. In fact, I remember seeing Punky Mitchell's rake for the first time, and said "whoa!" Too much rake was slow in Southern California in those days, but I think with the bigger sails of modern rigs, the more rake you can get the better (as long as you can still sheet the main.)

I also remember a Star World's Champion, who shall remain nameless, who occasionally got stuck between the tiller and the boom, but whose crew was trained to pull the stuck skipper to the high side when he heard the "grunt#**#!!" coming from the back end.

The reason going over the tiller was that it was faster and more direct than dipping into the cockpit and climbing out the other side."

PHIL SPAULDING
And the flat Stars

Bill Buchan notes that Skip Etchells was not the first person to whom Phil Spaulding gave the specifications for a flatter Star. As far as he knows the first Star to be built to these specifications was # 1552, the Nina, built in Tacoma by Allen Teitge, father of Robert Teitge now of the Detroit River fleet. Number 1552 was built in 1937, and Allen Teitge sailed her to a 6th District Blue Star in 1939. The boat was then sold in 1940 to Charles Ross, also of Puget Sound fleet. Ross renamed the boat to Cene. He did well with this boat, placing 6th in both the 1940 and the 1947 World's, 1st in the 1948 North American's, and 1st in the 6th District Blue Star in 1942 and 1947. Number 1552 was last listed as belonging to Robert Metzger, also of Puget Sound.

BUCHAN BOATS

From a conversation with Bill Buchan

The Buchan family business in Scotland was tied to boats and fishing. In the early 1920's they immigrated to the Pacific Northwest where they felt that they could continue their trade. Bill's father, while owning and operating a retail fish market in downtown Seattle, built a variety of sailboats boats for himself in his spare time during the late 1930's and into the 1940's. Thus, when Bill saw the Stars gather in Seattle for the North American Championship in 1948 and decided, at the age of 13, that he wanted one of those boats it was natural for his father to suggest that they should build one themselves. A major factor in the decision was that at the N.A.'s there were other sailors who were not all that much older than Bill was. Lowell North and Bill Ficker for instance, who were both in their teens, were there and instantly became his heroes.

It happened at this time near Bill's house in the Seattle neighborhood of Madison Park that there was a garage full of Stars, some 20 in all. It was the winter storage place for the Puget Sound Star Fleet. While he and his father got the plans to build a Star from the Class, they found it easier to go to the garage and measure the Stars that were there as well as to pick up on ideas for the construction of the boat. Somehow, the resulting boat was able to measure in as a legal Star. The boat was named "Torrid", # 2830, which was completed and registered in 1949.

The Buchans, father as crew and son, now 14, as skipper, started to race with the Puget Sound Fleet. The fleet was fairly active, with 20 or more boats turning out for the important races such as the Fleet Championship or what was then called the Pacific International Yachting Association Regatta where the Puget Sound Fleet would mix it up with the Canadians from the Vancouver area.

After a couple of years of sailing "Torrid" Bill became more acquainted with the finer points of boat construction in terms of taking advantage of the various tolerances which were allowed in hull construction and design. The Class was abuzz with what Skip Etchells was doing with his O.G.'s (from Old Greenwich Boat Co.). As a point of interest, Skip and his friend Bill Kelley actually built the first Etchells Star in the same Madison Park garage while they were employed in the Seattle shipbuilding industry during the war. Bill and his father then set about building a new boat which took advantage of some of these "builders tolerances". The resulting boat was "Bydand". # 3213, built and registered in 1952. Bill went to Newport Harbor for the Christmas Regatta that winter to crew with another Seattle Star sailor where he saw George Fleitz, who was amazingly fast in his O.G. Wench IV, Star # 2951. Fleitz had synthetic sails made by Kenny Watts which Bill had no idea even existed. Bill wanted to order a suit of these sails, but Watts didn't want to sell sails to someone who might make his sails look bad.

That summer, John Cram and his brother Wally showed up in Seattle with O.G. # 3298, "Scram", and showed awesome speed in their O.G. as well, interestingly enough with cotton sails, also made by Watts. It was obvious to Bill that it was the O.G. boat and not necessarily the synthetic sails that were responsible for generating such performance. After looking at Cram's boat Bill came to realize that there was more wiggle room in the hull tolerances than he thought possible. This was accomplished by utilizing what the Class called the "moving baseline". By doing so, a boat could be flatter by 2" from the original plans instead of the 1" that he thought was the maximum and still measure in. That was enough to prompt Bill to build yet another boat, #3382, the first "Frolic", in that same summer of 1953.

One of the other hallmarks of the O.G.'s, which wasn't discovered until a couple of years later, was the wide bow. Skip had opened up the half beam measurement at station 1, a measurement that at that time wasn't recorded on the certificate, making the stem more plumb which had the effect of increasing the sailing length of the Star. Realizing that, Bill performed major surgery on the "Frolic" the winter of 1956.

With the building of "Frolic" Bill became a builder of record in the Star Class Log, and Buchan Boats under the symbol BUC was listed in the 1954 Log.

Unfortunately, "Frolic" did not receive her measurement certificate by the time the North American Silver Star series of 1953 took place, and he and his father had to take "Bydand" to Milwaukee. They finished in the lower third of the fleet.

Frolic, # 4260, leaving Bill's shop for the first time in the Spring of 1960.

Since Bill couldn't get Watts to sell him sails he had a local sailmaker build him a suit from Dacron in 1954. He and his father participated in the 1954 N.A.'s, this time held at Rockport, MA. With the new boat and sails they were now whistling another tune and finished 15th out of 37. About this time Murphy and Nye began to make synthetic sails out

of a fabric called Orlon, which were very successful so Bill began to buy sails from them in 1955.

After a few years of sailing the "Frolic" #3382 successfully in the 6th District and doing somewhat better at the 1958 and 1959 World's (9th and 10th) Bill decided to build a new "Frolic", #4260, during the winter of 1959/1960 in the garage of his new home on Mercer Island. With this "Frolic" Bill won the 1961 World's with Doug Knight crewing. The next year they went to the World's at Cascais where they finished 4th. (Star #4260 stayed in Portugal and is presently being refinished by its owner Mario Guedes de Sampaio.)

Bill Buchan and Doug Knight
on their way to winning the 1961 World's
at San Diego

In 1963 Bill built Star #4660, also named "Frolic". The main characteristic of #4660 was that it was narrow at the chine and wide at the sheer with minimum freeboard, as compared to 4260, which was a very narrow shape. Bill felt that this design might have better speed in strong wind conditions. With this boat Bill was 5th at the 1963 World's at Chicago. This was also the boat that he sailed at the 1964 Olympic Trials, held in Chicago too. Although the boat certainly performed well in the breezy races, Chicago, as we now know, isn't really the "Windy City" that Bill thought it was.

Not being satisfied with that boat, he then built Star #4913 in the fall of 1964 and finished 3rd at the 1965 World's at Newport Harbor. This was followed by Star #5260, built in 1968, which was raced in the 1968 Olympic Trials in San Diego.

Bill Buchan (left) and Doug Knight
after winning the 1961 World's

In 1968, because of a housing slowdown in the Seattle area, Bill's construction business tapered off. That, and the advent of fiberglass made it apparent that Bill might want to build Stars for a living. Fiberglass boats had become allowed by the Class by this time. A plug was built in Bill's shop based on the lines of 4260, which seemed to him as the most well-rounded of all the boats he had built in the interim. The work of building the molds as well as the hulls themselves was done by the Clark Boat Co. in Kent, Washington. Bill brought the unfinished hulls back to his garage/workshop and finished them off there, working mostly on nights and weekends.

At first a very low-density foam core was used but that proved to be unsatisfactory. These boats started with #5333, which Bill sailed in the 1978 Worlds. He remembers Lowell North, Pete Bennett and Barton Beek also sailed his boats at that regatta. By the next year he switched to balsa core in the high load areas of the boats.

Bill won the World's at Marstrand with #5460 which was built utilizing the new lay up.

One of the early problems, which Bill encountered with the fiberglass boats was that there was a surprising amount of shrinkage. The molds had to exceed maximum length by a slight amount, for example, in order for the boats to measure

in properly. New molds were built in 1971 for the 5600 series boats, many of which were delivered to their owners at the Seattle World's Championship that summer. In 1973 Bill built a second boat for Lowell North, Star #5662. This boat won the 1973 World's for Lowell and then won the 1974 World's with Tom Blackaller at the helm.

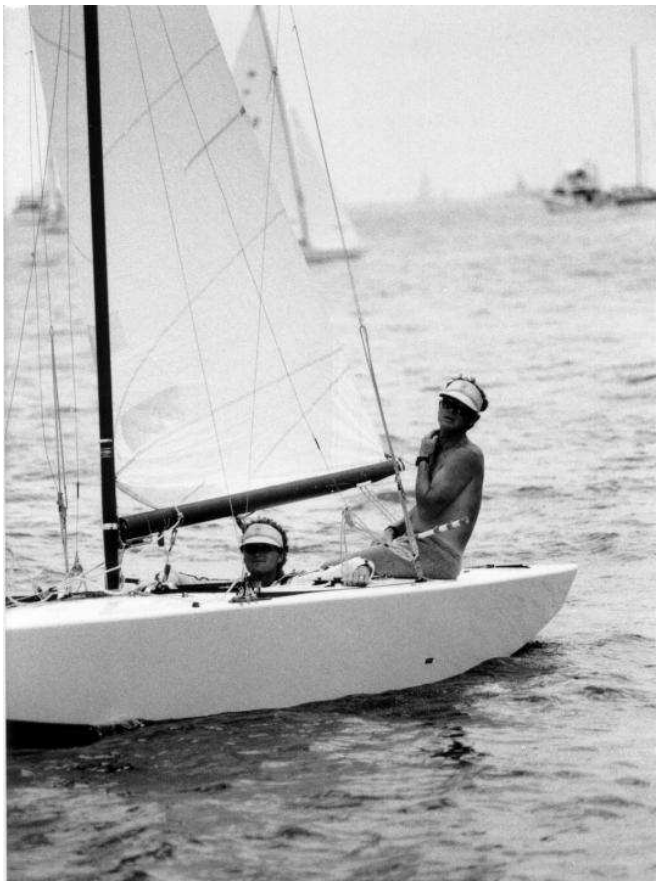
Star # 5445, Magic, built for Bob Rodgers of the Green Lake fleet. Trailer built by Spar Tech. Note the position of the traveler, half way between the rudderpost and the transom. The starboard bilge pump is just visible in the cockpit.

The 5600 series molds were sent to Ron Anderson and Larry Whipple after the 1974 World's so that the boats could be built someplace else since Bill's construction business was now taking all of his spare time. Sometime later the molds were brought back to Seattle and were eventually sold to a group of people in Brazil.

With his son Carl's good friend Chris Mass doing most of the work, Bill then built a split mold in the hope that the boats would be easier to assemble, by someone other than himself hopefully.

One interesting phenomenon is that boats built in a split mold cure to be a flatter shape athwartships and boats built in a one piece mold wind up being of a rounder shape. The flatter boats out of this mold were not especially good in light air whereas the rounder ones, for example those molded by Miller, out of a still later mold proved to be good light air boats.

At about this time both Howard Lippincott and Bill Gerard asked Bill if they could use 5600 series boats, which they had at their disposal, to build molds for their own use. In both cases Bill said it would be fine and as a result, several boats were built by both of their companies over the next several years, one of them being the boats with which Buddy Melges won the 1978 and 1979 World's. Mader was also interested in utilizing the Buchan design so Bill sent over to them a hull from which they built a mold. Mader, working with the MacCauslands, have continued to use basically the same Buchan hull shape to this day.



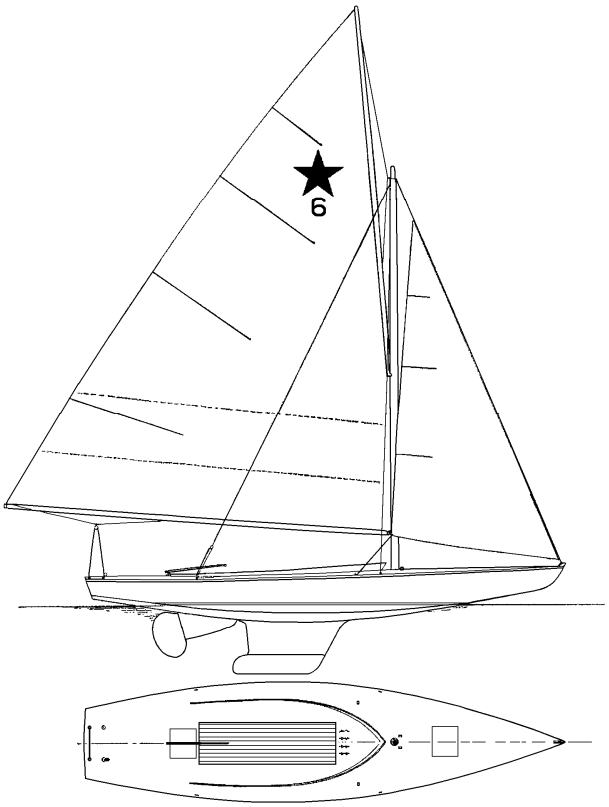
BILL & CARL BUCHAN
at the 1976 Bacardi's in # 5647

BILL BUCHAN & DOUG KNIGHT
winning the 1979 Bacardi Cup in # 6042

THE DEVELOPMENT OF SPARS
IN THE STARS

HISTORY OF THE STAR RIG

When the Star rig was designed in 1911 by Francis Sweisguth it was a gaff rig with a long overhanging boom. This was a fairly common rig for racing boats of the era. The rigging which held the mast in place were the jibstay, a single set of shrouds which attached at the jibstay intersection, and a set of backstays which also attached at this point. Because of the hoops on the luff of the mainsail there were no spreaders.



The Star as originally designed

In the early 1920's the Class made the switch from the gaff rig to the short Marconi rig. The use of spreaders became possible, although not mandatory, and several different rig configurations were tried out. Then, when the Class voted to go to the present rig dimensions in 1930 again the question of how many spreaders and their placement was left up to the discretion of the skipper. As a matter of fact, the experimental rigs tried out in 1929 under the direction of Francis Sweisguth used double spreader rigs, and during the 1930's double spreader rigs were predominant in the Class. In the middle of the 1940's the present rig configuration was experimented with and then generally adopted. Stan Ogilvy in his book "Successful Yacht Racing", (1951, page 60-61) gives the advantages and disadvantages of this rig, with his list of advantages far outweighing the list of disadvantages.

Despite this there were always some people wanting to try out other rig configurations, and in the era of wooden rigs this was a relatively simple matter. For example, on the cover of the 1960 Log is a picture of Harry Nye in one of his Gales showing the double spreader rig. But it would seem that by and large the list of advantages enumerated by Ogilvy continued to operate even into the aluminum spar era which began in 1971 and little thought has been given to going to another design. Specification 10.3.2. clearly states that the size, design and number of spreaders is optional.

TUNING THE STAR RIG

GAFF RIG ERA

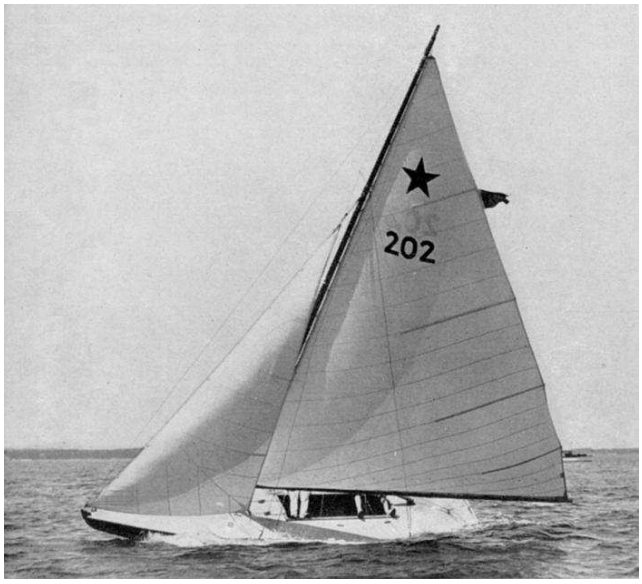
From all available descriptions of the early Stars there was little which could be done to fine-tune the rig. The mast was placed in a hole in the deck and the butt in a simple mast step. The chainplate consisted of a strap of metal protruding from the rail slightly aft of the mast. There was only one hole in this strap to which the shroud was tied. As designed, there were no adjustments which could be made to either the rake or the position of the mast. The mainsail was lashed onto the boom and the gaff, and hoops were sewn to the section of the luff of the mainsail which slid up and down on the mast. The possible adjustments were such things as jib and mainsheet tensions, backstay tension, halyard tensions, and outhaul tensions on the boom and the gaff. The outhaul adjustments were made only before setting sail, and even the halyard tensions, once set, were not adjusted once the boat was underway. However, by 1917 Gardner in letters to prospective Star builders was recommending sail track and slides on the boom to facilitate sail care.

SHORT MARCONI ERA

In 1921 the first major change in the Star rig took place. For a couple of years previous to this various people had been experimenting with a Marconi rig which would take the place of the mast and gaff. Because the gaff was carried vertical and practically parallel to the mast it was a simple matter to switch from one rig to the other without having to perform major surgery on the mainsail. In 1921 the Marconi rig was allowed as an alternative to the gaff rig, and by the end of 1922 most of the top skippers had made the changeover to what is now called the short Marconi rig.

Once the short Marconi rig was adopted sail tracks were put on the mast and boom and sail slides on the sails. There were two advantages to having sail tracks and slides: 1) sails could be more easily changed before setting sail, and 2) the outhaul and halyard tensions could be varied.

For two years running, 1922 and 1923, Bill Inslee of the Western Long Island Sound fleet was the Champion of the Star Class. Bill wrote an article about boat preparation for the April-May, 1924, issue of Starlights. This article is very illuminating in letting us see what a top skipper considered to be necessary to tune up his Star. Bill deals with everything concerning the boat. He begins with a description of how to get the smoothest bottom. Then he deals with getting the proper balance in the helm when going to windward. He mentions the importance of the proper position of the keel, the placement of the mast, the rake of the mast, the position of the jib fairleads, and backstay tension as various components which went into getting a balanced boat. It might be mentioned that as designed the keel was a little too far forward and it became quite common to move the keel as part of the process of getting the boat tuned up. Added to the various items concerning tune and boat care touched on in the article there is mention of a way, by using an adjustable headstay, to control the draft of the sail depending on the strength of the wind by flexing the mast. It is obvious that by this time the top skippers did not just take the boat as it was originally designed and built, but worked on it to bring the boat into balance and make various aspects of the rig adjustable.



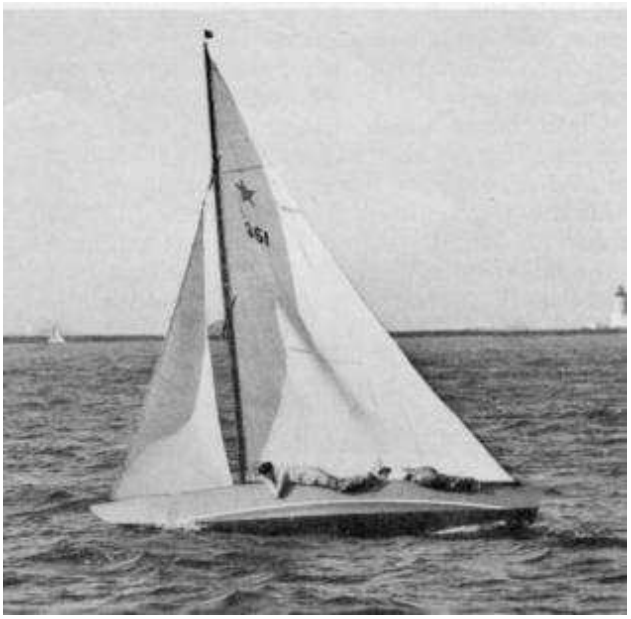
Adrian Iselin's Ace in 1925

Backstays Tracks make an Appearance

The backstay arraignment did not change until the mid-1920's In the above picture of the Ace taken in 1925 the backstays are still as originally designed, a 2-to-1 block-and-tackle system located on the rail at the aft end of the cockpit. Backstay tracks were made popular the following year when Ben Comstock and Bill Gidley won the World's in Rhody. Walter C. Wood of their fleet had devised a backstay track system. In a fashion which has become a hallmark of the Class every top boat had to have these "Rhody runners". It took the Class another 60 years to move away from backstay tracks, and now on some of the recent boats we are back to the 2-to-1 block-and-tackle system, although now located further forward.

THE EARLY TALL MARCONI RIG ERA

During 1929 a second rig change was under consideration by the Star Class. Experiments were carried out on a high aspect-ratio mainsail. The boom was shortened and the mast lengthened to the present dimensions, and the sailing qualities of the Star dramatically improved. This new rig was adopted for 1930.



Colin Ratsey's Joy in the 1932 Olympics
Note the substantial mast and straight rig.

Rig Configurations

Just as in the short Marconi rig era there were a variety of rigging configurations on the tall Marconi rig. However, for most in the 1930's the standard was to have a double spreader rig. To control the masthead two systems of stays were used. Some went to having a jumper strut at the jibstay intersection along with the upper set of spreaders. Others used a headstay. While there were no specified dimensions for mast sections, the earlier Logs during the wooden spar era recommended 3½" round at the deck. This was changed to the more realistic number of 3" in the 1946 Log.

Batten Lengths

The original specifications for batten length read: "Upper batten not over 3', other three battens not over 5' 9". Three allowed in jib, located as per plan, not over 1' 9" each." With the modern sail plan the length of the battens in both the main and the jib were shortened. The new specifications in the 1930 Log read: "Upper batten not

over 30", 2 middle battens not over 48", lower batten not over 36". Three allowed in jib, located as per plan, not over upper batten 8", other 2 battens 12"." (Note the slight problem with the wording.) No information is available as to why the change was made, but because it was common to reef the main in those days maybe it was determined that lowest batten in the mainsail was always getting in the way of the reefing operation and so it was shortened to 3'. As a guess the upper batten was shortened from 3' to 30" because the batten otherwise was getting fairly close to the mast because of the sharper angel at the headboard.

Stiff Mast of the Early Tall Rig Era

At first for some unexplained reason the knowledge shared by Bill Inslee six years earlier about the benefit of a flexible rig to control the draft of the mainsail by varying the tension on the headstay / jumper stay was ignored and the early tall rigs were carried ram-rod straight. The masts were also, by all accounts, massive in comparison to the masts which were to come later on.

Walter von Hütschler and Flexible Spars

Walter von Hütschler rediscovered the benefit of a flexible rig, although, according to him, quite by accident. What Walter claims he was really trying to do was to eliminate as much weight aloft as possible by paring down the mast and boom. He took so much wood off the mast that it became flexible on its own. He learned how to control this flexibility and because of the advantage of sail draft control Walter became unbeatable for the years 1937 - 1940. Only because of a problem with his rig in the first race of the 1937 World's did he not win the series that year.

Walter von Hütschler in his Pimm, #1420, in 1938

Because of the flexible spars the sail tracks began to buckle. These came off fairly quickly and the tracks were replaced by boltrope grooves. Walter was one of the early leaders in having boltrope grooves in his spars. Many cotton sails still in use in the 1950's showed signs of once having had sail slides being sewn to the boltrope even though they were now used on masts with grooves.

In 1940 Parkman Yachts published a pamphlet written by Walter entitled "*Little but Perfect*" in which he describes the operation of flexible spars. His main thesis in the pamphlet is that once the rig is set up properly the flexing of the rig is automatic. The more the mainsheet is pulled the more the rig flexes and the flatter the mainsail.

During the late thirties there was a variety of designs for adjustable mast steps and adjustable mast partners. Some skippers tried to induce bend using these mechanical devices in conjunction with the backstay. It was part of Walter's mission in writing the pamphlet to disabuse these skippers of the notion that forcing the mast to bend was of any benefit.

Throughout the 1940's the double spreader rig began to be replaced by the single spreader rig which we still use today. Also during these years masthead halyard locks began to be employed. The tension on halyards which were cleated on the deck or below deck proved to be too much for the mast, especially when it started to flex. There were reports of masts exploding because of the pressure which built up on the mast due to the load of the halyard.

George & Juanita Elder in ISCYRA VI in 1941
Items of note: massive mast; mechanical mast partners; roller reefing with “claws”; fixed gooseneck; below-deck halyard cleating; single jib fairlead loop; long chainplates; snubbing winch.

In order to compensate for the loss of an adjustable halyard, a moveable gooseneck fitting, consisting of the gooseneck having a slide and a track being mounted on the backside of the mast, came into use. The moveable gooseneck, in conjunction with an adjustable outhaul, made it possible to adjust the boltrope tension on the luff and foot of the mainsail while under sail. As the boat rounded the windward mark the crew would let off the outhaul and after setting the whisker pole would jump up on the deck and pull up the gooseneck until the luff boltrope was slack. Then the blocks in front of the mast were pulled and the mast was let forward. Finally the boom vang, if the boat had one, was hooked into a fitting on the rail. The reverse operation had to be performed before round the leeward mark.

THE 1950's AND 1960's, A TIME OF INNOVATION

Wooden Spar Construction

As masts got lighter and more flexible through the 1940's, 50's and 60's, the technique for building mast out of wood became more sophisticated. The masts of the thirties were often made out of a single piece of wood. (Try finding a single piece of Sitka spruce today which is long enough for a Star mast!) But it was found that there was a benefit in having masts built up of two or more pieces. Laminated masts tended to exhibit a more uniform bending characteristic. Various methods of lamination were tried. The simplest was to glue two 2 x 4's side-by-side creating a mast with the lamination fore-and-aft. This was then planed down to about 2½" wide by 3½" deep. The masts from Old Greenwich Boat Co. were more sophisticated and were built up of four pieces of 7/8" x 3" Sitka spruce which were laminated front to back with the boards running athwartship. Eichenlaub and other West Coast builders went to building a Sitka spruce box around a red cedar or redwood core. In general the Etchells masts tended to be 2½" wide and 3½" deep whereas the Eichenlaub and other West Coast masts (Eriksson for example) tended to be closer to having a square cross section, about 2¾" wide by 3" deep.

Tuning Wooden Spars in the 1950's and 1960's

The thesis of automatic spar flexing as espoused by Walter von Hütschler was taken to heart by Skip Etchells. Once Skip had gotten his boats dialed in there was very little adjustment available to the skipper as the boat was delivered from Old Greenwich Boat Company. For example, during the 1930's, 40' and 50's the chainplates on many boats were at least one foot long with a series of holes drilled into it, usually about an inch apart. This was so the mast could be moved back and forth for the full allowable length of the mast partners and the shrouds moved accordingly. By the time the "D" series O.G.'s were built in the late 1950's by Skip the chainplate was 3 inches long with three holes drilled into it, and of these holes the forward-most hole was the only hole for the lower shroud. While there was quite a long adjustable mast step in the boats there was really a very limited position in which the mast could placed due to a fairly limited amount of room fore and aft at the mast partners. Also by the time the "D" series were built mast blocks which looked like fat-bottomed T's took the place of mechanically adjusted mast partners. It was found to be much quicker to just pull the blocks out from in front of the mast when letting the rig forward on the run rather than having the crank the mast partner forward.

Jumper Strut versus Headstay

When the first version of the tall rig was tested a jumper strut was used to control the masthead. While it was well known that using a jumper strut allowed for more pressure to be placed on the jibstay and thus make the jibstay tauter, for some reason many people used headstays. For example, Skip Etchells went with a headstay in his early model boats. It was not until about 1965 that he switched to using with jumper struts on his boats. However, this jumper, rather than being a single strut, was a V shaped strut made out of an aluminum casting with a pair of aluminum dowels stuck into it.

STARS UNDER CONSTRUCTION AT PURDY BOAT COMPANY

This picture was taken sometime during the 1930's at the Purdy Boat Company of Port Washington, N.Y. Four Stars are being built, two of which are nearing completion. The deck layout, fairly standard for the time, is clearly visible on the boat in the foreground. Note that this particular Star has a mid-cockpit traveler. The one directly behind it does not, but does have the double traveler system.

Aside from placing more pressure on the jibstay, another benefit of having a jumper strut was that if the correct thickness of wire was used there was enough stretch or spring in the wire so that once the correct tension was set up on the wire the masthead would automatically flex to the proper curve as the wind strength fluctuated. The wire most commonly used was a 3/32" halyard wire.

Backstays

On many of the boats up to the late 1950's there was only a single backstay which was attached to the jib halyard cheek plate ears at the jibstay intersection. On these boats the amount of bend in the mast was controlled by the tension on the headstay or jumper strut wire and the amount of blocking fore and aft of the mast at the partners. As masts got lighter and lighter it was found necessary to have both lower backstays and in the cases of really light masts masthead backstays in order to keep the mast from breaking while going downwind. It was quite some time before the lower backstay began to be used to power up the rig as well.

Traveler

From the very beginning Stars had travelers. It was not until Dennis Conner took his traveler off in the mid-1980's that boats began to abandon its use. However, even today there are skippers who because they sail with light crews feel that having a traveler is of great help in windy conditions.

The original traveler was a brass rod located on the transom. (See the original sail plan above.) As designed there was no control over how far the slide went on the rod, but some skippers placed stops on the rod to limit the distance the traveler slide would travel.

During the 1930's tracks began to replace these rods. Often, two tracks were placed on the afterdeck, in part to help control the position of the "claw", a cage affair which allowed for roller reefing. Some boats even had a third traveler which crossed the cockpit approximately where the barney post is located today.

From what Walter von Hütschler writes in his pamphlet, apparently the traveler slides on these early travelers were controlled by stops which had to be manually set.

By the 1950's people came to the conclusion that roller reefing was not very effective. Thus the need for having two or three traveler tracks ceased to exist and it was found that a single traveler, located on the frame just behind the rudder post, was enough. It was also realized that being able to control the traveler slide was important so a rope or wire was attached to the slide. With this the slide could be kept in the center in light winds, and as the wind increased the traveler could be let off as needed to keep the boat balanced.

Synthetic Sails

During the 1950's sails began to be made out of synthetic materials. First nylon was tried, but the material proved to be too stretchy. Orlon was somewhat more stable and sails made from this material appeared in the mid-1950's. Finally Dacron came on the scene in the late 1950's. While it is questionable whether Dacron sails were superior to cotton sails as long as the cotton sails were in top condition, it was obvious that Dacron sails held their shape better and were not affected by getting wet, something which is rather hard to avoid on any boat but in a Star particularly.

With synthetic materials came the ability to have windows placed in the sails. At first these windows were small, the total allowed measuring three square feet. With window space at such a premium, only windows in the lower mainsail were used. Today a total of a little more than 8 square feet is allowed and windows are placed both in the main and the jib.

Changes in the Jib Luff Wire System

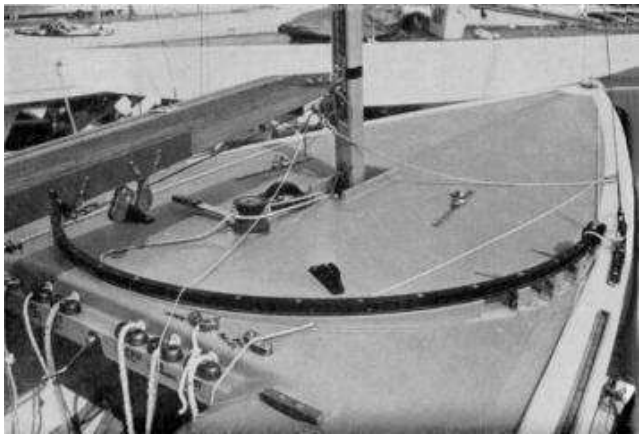
During the 1950's jib construction underwent a change. Up until this time the jib was hanked onto the jibstay wire. Then Murphy & Nye came out with a jib which had the jib luff wire sewn into it. The luff wire was purposely sewn in a little long so that as the pressure on the jib luff cloth increased it could stretch until the slack in the wire was taken up. Once the jib was raised the halyard was locked aloft and the wire in the jibstay took the place of the standing jibstay. By 1960 this had given way to having the jib luff wire floating freely inside the jib luff cloth at the tack. A separate shackle had to be installed on the deck at the jib tack which independently controlled the amount of tension on the jib luff cloth. The next step after this was to have a threaded jib. In this operation the jibstay had to be disconnected and threaded down the pocket in the jib luff. After loosing a few masts over the back the Governing Committee decided that the jibstay could not be disconnected at anytime to raise the jib. Thus boats which wanted to continue the practice of threading the jibstay into the jib luff had to have a second wire outside the jib luff. This second wire was put to use in pulling the mast forward on the runs, but going upwind was always a nuisance as it was hard to find the right tension to keep it from flailing about while at the same time not have any appreciable tension on it. The system of having two separate jibstays remained in use up until the last of the black aluminum mast days. Now, in a sense the principal of jib construction has come full circle, with the jib being attached to the standing jibstay, which has become the supporting jibstay once again. Now however the jib is zippered onto the jibstay rather than being hanked to it.

Jib Fairlead Adjustment

Jib fairleads have run the range from being a single loop on the deck to being fully adjustable both fore and aft and athwartship. As designed the Star had a single loop on the deck. By 1924 when Bill Inslee wrote his article on tuning it appears that his fairleads were fully adjustable in terms of positioning, although it seems that this could only be done manually. Despite the obvious need to have some adjustment of the fairleads certain builders continued to offer only a single loop right up into the 1950's.

With the old high-cut jibs the fairlead was positioned about 10" aft of the mast and about 17" off center. Many boats had tracks running along the 10° line so that the fairlead could be adjusted fore and aft, but not laterally. However, Barber haulers came into use in the early 1960's so there was no need for lateral adjustment. When the jib slot needed to be opened up this was accomplished by pulling on the Barber hauler.

By the late 1960's "deck sweeper" jibs took the place of the standard high-cut jib, but the angle at which the fairlead should be placed remained the same. In the articles about tuning written by Malin Burnham and Lowell North there was a difference of opinion as to what degree off center the fairlead should be placed. Malin called for 9° whereas Lowell mentioned 10° to 14° depending on the strength of the wind. As the picture below shows, Lowell had a single jibsheet fairlead track along the 10° line and Barber haulers to trim the jib off the 10° line.



In 1969 Lowell North bought a Buchan boat, # 5392. This shot of the deck layout shows wooden spars. Note the single jib fairlead track on the 10° line and the Barber hauler running from a jam cleat to the rail and then back to the boom for storage. This was the last year in which only wooden spars were allowed.

Jib Sheet Systems

When the Star was designed the jib sheet was just a single line led from the jib clew through the jib fairlead and from there to a cleat. By the 1930's it was felt that there was need to be able to pull on the jibsheet tighter in windier conditions. A winch was placed on the deck just forward of the cockpit and commonly a cleat was installed in center of the forward edge of the cockpit in order to cleat the jib. Although originally used on some boats in the 1930's, it wasn't until the 1970's that the two-part jibsheet system became common, eliminating the need for the winch.

Cunningham

About the same time that jib cloth downhauls were introduced onto Star boats Cunninghams began to be used to tension the mainsail's luff boltrope. At the very least this made life easier for the crew but it also made adjustment to the mainsail's luff boltrope more efficient. In terms of rigging this was not a very difficult changeover. Instead of having the crew jump up on the deck to slide the gooseneck up or down on the gooseneck track the boom was allowed to be left at the black band and a line was led to the mainsail tack cringle, or in some models of sails to the Cunningham cringle which was a few inches above the tack cringle. There was no standard setup for this: some had a cleat just below the black band to which the Cunningham rope was cleated and others led the Cunningham rope below deck, sometimes to a block-and-tackle arraignment.

Duarte Bello, designer of Star Fittings
Star # 3870, Faneca, with a circular boom vang in 1962

Boom Vang

It is hard to imagine today, but up through the mid-1950's the major way of keeping the boom from lifting while on the run was to have the crew sit on the boom! During the

late ‘50’s various methods of doing this mechanically came into being. One was to have two or more hooks along the rail into which another hook hanging on a wire suspended from the boom was placed. This wire was led below deck, usually to a boom vang drum. The trouble with this boom vang was two-fold: 1) every time the skipper wanted to gibe the crew had to unhook the vang as part of his preparation for the gibe, and 2) when the wind was really blowing it was really quite some chore to unhook the vang.

In the early 1960’s Duarte Bello, the Star boat fittings design wizard and manufacturer, came up with the idea of a circular vang track. However, this idea did not catch on immediately and the first step which people took towards having a circular track was to have vang car track mounted on each rail. At least this way the crew did not have to make the correct decision as to which of the vang hooks on the rail the vang should be hook to, and if there was a change of angle of the boom the car would just slide along the track to compensate for the change of angle. Of course, when gibing the vang still had to be unhooked and rehooked on the other side once the gibe was completed.

Finally, in the late 1960’s the circular vang track became more common, but competing against this was the boom vang lever which began to show up in the mid-1970’s. The lever was attached to a channel post which was directly behind the mast and bolted to it. The only real defect with the boom vang lever was that a depression aft of the mast had to be made so that the lever would have enough leverage.

Mast Rake and Position

Over the years greater and greater mast rake had been used. When the tall Marconi rig first appeared the general tendency was to keep the end of the boom about 1’ to 1½’ feet off the transom when hard on the wind. By the late 1950’s 1’ was more the norm, and by the latter part of the 1960’s two-blocking the boom is mentioned by Malin Burnham in his article on tuning. Since the jibstays were not of a standard length there was no mention of the magic number which is used in today’s tuning guides.

Because the masts were not bent as much as they are now the location of the upper and lower shrouds on the chainplate was reversed. The uppers were attached to the chainplate at about the front of the mast and the lowers were positioned about 1” to 1½” in front of the mast.

The mast was positioned so that the end of boom (or if it had the black band the band) came just to the transom or slightly inboard of it.

General Principles

The general principle which operated throughout the 1950’s and 60’s was once you had the boat properly set up the harder it blew the harder you pulled. In light to moderate breeze the jib was set just tight enough so that the first thing to show signs of luffing as you pointed the boat up was the first few inches of the luff of the main. As the wind picked up the jib was trimmed harder, the mainsheet pulled in harder, the outhaul and downhaul / Cunningham tightened, and the traveler eased.

In San Francisco particularly during the late 1950’s when the wind got to its customary 25 knots it was common to see a huge bubble in the main with just the jib and batten area of the main working. This was because both the jib and the main were strapped in really hard and the traveler was let off until the end of the boom was above or beyond the corner of the stern. Whether this was fast or not is questionable: the San Francisco fleet at the time was not very competitive with the rest of the West Coast boys.

Lowell North and Jim Hill on North Star, #3877 in 1957. Note the amount of backstay rope.

Lower Backstays And Powering Up the Rig

As mentioned above, the original purpose of the lower backstay was to keep the mast from pumping in rough seas and became common on boats in San Francisco and the West Coast generally in the late 1950’s. Collective memory can’t exactly place when the use of lower backstay to power up boat came into play. However, photos from the late 1950’s of Lowell North’s North Star, #3877, show what looks like very substantial block-and-tackle on the lower backstay, so perhaps even by this time some few skippers were using the lower backstay for more than just stabilizing the rig.

Despite this conjecture even by the mid-1960's when Malin Burnham and Lowell North wrote articles for Starlights about tuning a Star neither of these articles mentions that the lower backstay was used to power up the rig. They agree that the purpose of the lower backstay was to keep the mast from pumping in rough conditions. Bill Buchan wrote an article for the November, 1980, issue of Starlights and again there is no mention of the lower backstay being used to power up the mainsail. Bill noted recently that "once you found the magic adjustment spot they weren't changed all that much."

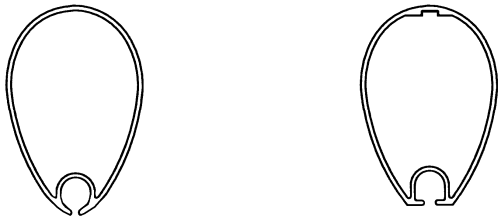
ALUMINUM SPAR ERA

In 1971 spars made of materials other than wood were first allowed by the Star Class. The new paragraph in the specifications for spars read, "*Other materials.* Spars of aluminum, fiberglass, or plastic, or combination of fiberglass and plastic with wood, are permitted…" As Alan Holt pointed out in his article *Modern Mast Technology*, "The Star Class was one of the last one design classes to adopt aluminum spars as there was much trepidation that aluminum would not be as good as wood. Aluminum tip weight was set so that the ultra light wood masts would not have an advantage over the proposed metal masts. It was soon evident, however, that aluminum spars were stiffer and/or smaller (less windage) than wood for the same weight, cheaper, stronger and more maintenance free - an obviously unbeatable combination. Aluminum spars dominated the first major regatta after their introduction."

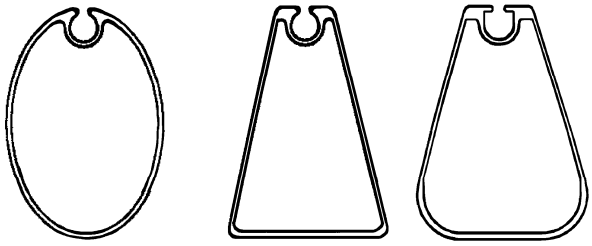
While Alan, who runs Spar Tech with Richard Gates, focuses on aluminum spars in the article, mention should be made that fiberglass and composite spars were also experimented with, but these experiments did not prove to be successful.

As with any new technology, there was a steep learning curve with aluminum spars. In the first years of production there was a rapid succession of models of mast sections built by Spar Tech. Between the introduction of aluminum spars and 1972 the models went from A to D. Both the A and B section masts required jumper struts in order to keep the masthead from falling back too much. The B section had a V jumper. With the D section enough stiffness was built into the mast so the jumper stay was no longer needed. The D section, at first black anodized and then later silver, continued to be used by Spar Tech until 1992, and is still the section used by Emmeti. The F section with the flat back is currently in production by Spar Tech. The F section not only has added beef in the area around the flat back, but also has extra material on the inside of the leading edge, giving the mast more stiffness fore and aft.

Booms have undergone more radical design changes. Oval sections were normally used with the black D section masts. The sharp-edged trapezoidal section came in 1987. This was replaced by the present rounded-edged trapezoidal section in 1989.



"D" and "F" section masts. Note the extra material on both the leading edge and the aft edge of the "F" section mast.



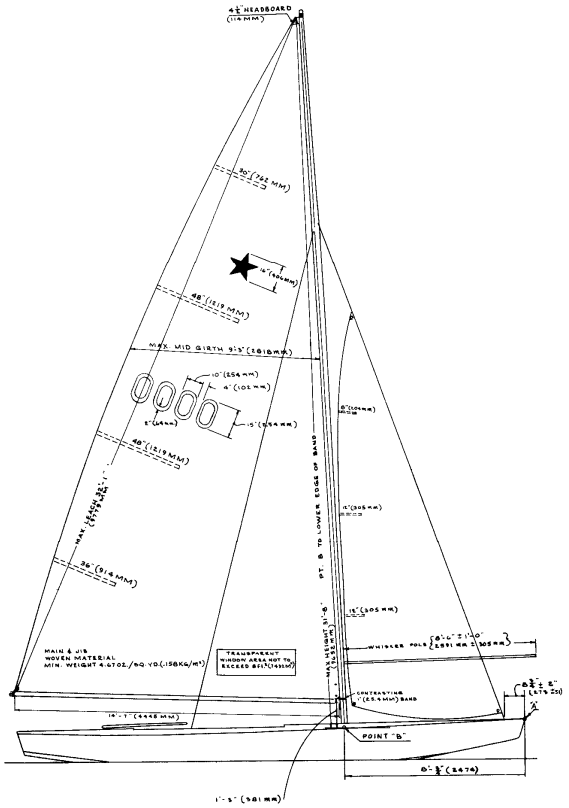
The oval, sharp-edged trapezoidal, and rounded-edged trapezoidal boom sections.

Buddy Melges & Andreas Josenhans
World's Champions, 1978 & 1979

The Widgeon, # 6346, had many innovations, not the least of which was the elimination of backstay tracks in favor of an under-deck wire backstay system. Travelers were still in use with the traveler track just aft of the rudderpost, but Widgeon had the track recessed at the center line and then bowed up to about 2" above the deck at the rails. These items, combined with a computer-designed keel, extra stiffening provided by bulkheads, and buoyancy tanks on the floor to make the boat self-bailing made the boat radical for its time.

Rig Development in the Aluminum Spar Era

Once aluminum spars were adopted by the Class there was surprisingly little change in the overall rig configuration from that used in the late wooden spar era. At first there was some experimentation. For example Dennis Conner tried out having shorter spreaders, but apparently the extra load on the mast made it unstable. From time to time the double spreader system has also been tried, but until now such a system has not proved to be successful.

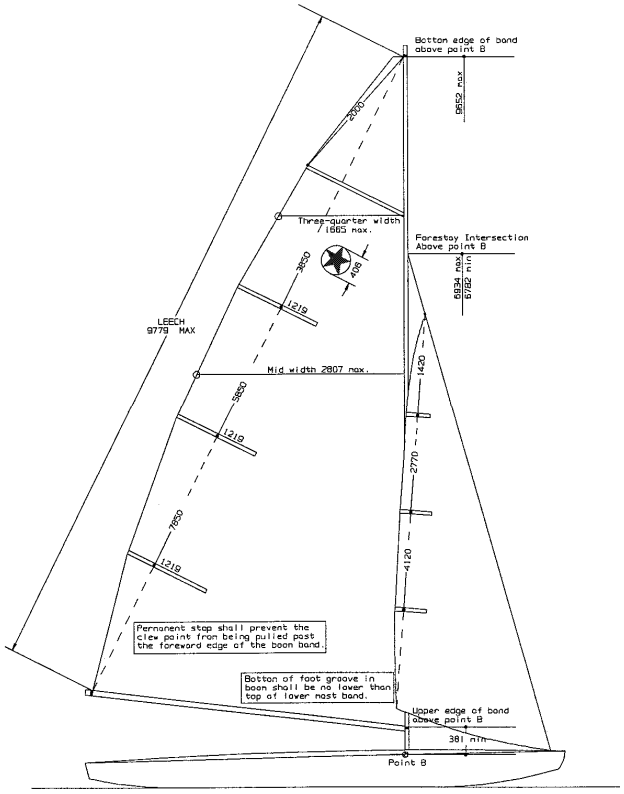


Sail Plan used in the 1978-1998 Logs

Sail Development in the Aluminum Spar Era
Yarn-Tempered Dacron and "Fat Head" Sails

With the advent of the aluminum mast which was more stable than the wooden mast it became possible to construct more powerful sails.

In 1978 Buddy Melges won the World's using a heavily yarn-tempered Dacron. While Buddy used this material to construct a flatter, slicker main to be used in the windy conditions of San Francisco, the use of this material created a real revolution in the art of sailmaking. Sailmakers found that with this stiffer sailcloth it was possible to add extra material to the upper roach which was not controlled by measurement at the time. As sail cloth material became better and stiffer and as the sail construction techniques became more sophisticated it was found that a fairly big roach could be constructed. The resulting sails became known as "fat head" sails. Finally, in 1996, the Technical Committee instituted a 3/4-girth measurement to control the growth of the roach size. However, this measurement took into account the existing sails, thus allowing the development of the "fat head" sails to stand. One of the consequences of the development of the more powerful "fat head" sails is the optimum crew weight has gotten heavier and heavier. As a result the Class instituted a weight limit rule which came into effect in 1999.



Sail Plan beginning with the 1999 Log

Roach Comparisons

Three sails were compared to see what the difference in roach is: a 1957 Murphy & Nye, a 1962 North, and a 1999 North. Using the 1999 North as the base line and placing the headboard holes in the same position the following are the variations in measurements:

	'57 M&N	'62 North
Roach at:		
Head Board	-1"	-¼"
Top Batten	-7¼"	-6"
3rd Batten	-6"	-6"
2nd Batten	-3 ½"	-3¾"
Lower Batten	-½"	- ½"

It should be noted that the length of the leech on the older sails was a bit longer than that of the modern sail, about 1". This is consistent with the fact that the rigs were carried more vertical at the time the sails were constructed. In the 1999 North the top batten is 59". If full-length battens were placed in the older sails these battens would have to be 51¾" in the M&N and 53" in the 1962 North.

The sail plans on the facing page are somewhat exaggerated, especially the 1998 sail plan. There is of course a certain amount of mast curvature which should be taken into account, and thus the amount of roach shown in the 1998 plan is greater than is really the case. Bill Buchan notes that ever since the late 1950's sails have been very close to the maximum dimension at the mid-girth measurement. From this one could infer that the leech from the clew to the mid-girth has stayed fairly much the same. In the "Star Class Tuning Guide" video there is a shot taken down the leech from the masthead. It is interesting to see that the ends of the lower three battens and the clew at the boom all line up in a straight line giving a straight leech between the boom and the third batten. This is in contrast to the 1998 sail plan in which there is a definite arc in the leech from the third batten to the boom. Also to be seen in this video shot is a gentle sweep of the leech from the third batten to the top batten followed by a more abrupt sweep from the top batten to the headboard.

A more recent leech shot is that taken of Mark Reynolds' boat #8067 which shows that all four batten ends are in a straight line.

Experiments with Laminated Material

In the December, 1980, Starlights there is a note saying that for the year of 1981 jibs built Mylar and laminated materials would be allowed for testing purposes "in all event except AA, A, B, B-2, and Fleet eliminations." This testing was allowed into 1982, and then both the main and the jib were allowed to be built of these materials in the years 1983 and 1984. In these laminated sails the only substrates allowed were Nylon and Dacron. At the annual meeting in 1984, mainly due to the advise of the sailmakers who attended the meeting, the resolution allowing laminated sails was voted down, and with this the testing program was discontinued. It is interesting to note that the objections voiced then continue to be of concern: "that Mylar sails would be substantially more expensive, and that it could not yet be stated with any certainty whether they would last as long as sails of conventional material."

The controversy and experimentation with laminated sails has continued with the Class so far not being impressed with the results of such experiments. The main difficulty seems to be that the mast flexes too much, distorting the relatively inflexible laminated material and breaking down the sail fairly quickly. In other class which have flexible rigs, where carbon fiber masts and laminated materials have been adopted it has been found that a sail last only one hard regatta, and that at the end of the regatta the sail goes straight to the dumpster. Very expensive proposition indeed!

FINAL THOUGHTS

From the information supplied in this article it can be seen that there are many options in terms of how a Star is set up, both in deck layout and in how the mast is rigged. If Stars look pretty much the same today it is because trial-and-error has narrowed down the options to fairly limited parameters and there is general agreement on how the boat is to be set up. This does not limit the individual boat owner from trying out new ideas, or reusing old ones!

References:

Bill Buchan: *Some Thoughts on Upwind Speed,* Starlights, November, 1980.

Malin Burnham: *Tuning and Techniques,* Starlights, September, 1966 & May, 1967.

Alan Holt: *Modern Mast Technology,* Starlights, November, 1980.

William L. Inslee: *Fitting out Your Star,* Starlights, April-May, 1924.

Lowell North: *Tuning to Win,* Starlights, June & July, 1967.

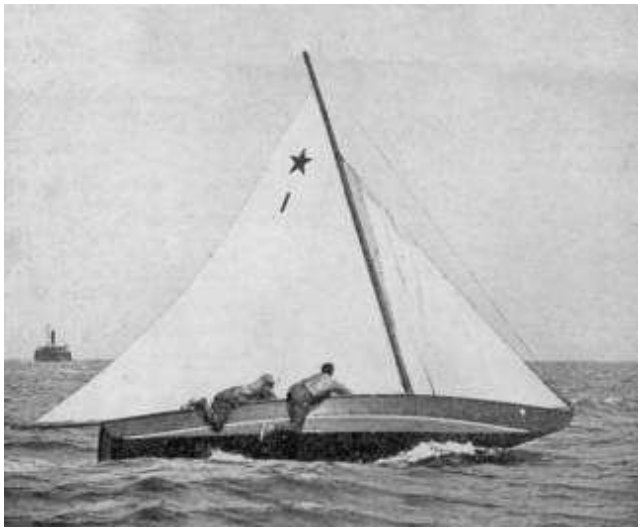
Walter von Hütschler: *Little but Perfect,* Parkman Yachts, 1940.

Any of the above articles are available from the editor, either as electronic files or in hard copy.

Thanks to Bill Buchan, John MacCausland, Mark Reynolds and Jack Button for supplying information for this article.

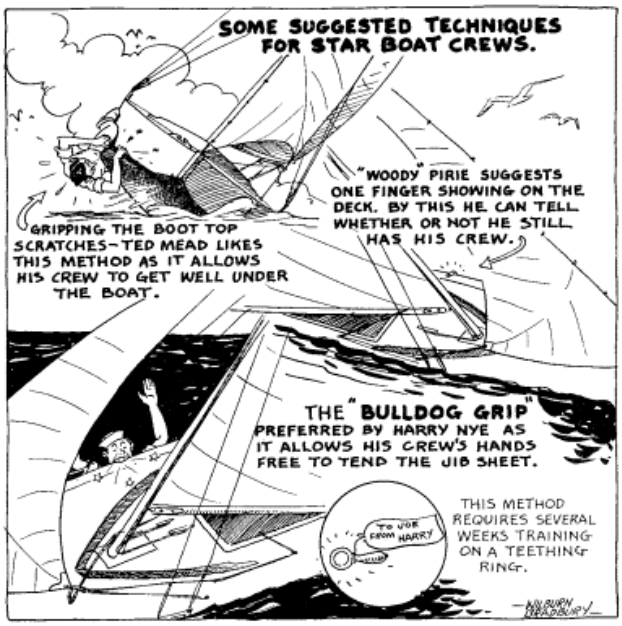
HIKING TECHNIQUES THROUGH THE AGES

The importance of getting crew weight over the side on a Star has been recognized since the earliest championship events. In 1924 Bill Inslee, who won the first two Gold Star events held by the Class in 1922 and 1923, wrote an article for April-May issue of Starlights which talks about getting the most out of the Star boat. Concerning hiking, his mentions that it is "essential is to put the boat in balance with the keel in proper position within the range allowed to float the boat on proper sailing lines, and still permit of the skipper and crew placing their weight where it will exert the most leverage and do the most good in holding the boat up in a strong breeze." Here we see Bill Inslee with crew Robert Nelson on their way to win the 1923 World's.



Walter von Hütschler had his crew Egon Beyn carry this hiking technique to another level with the crew hanging onto the side of the boat. Here we see them on their way to win the 1939 World's.

The 1940 Log carried the following cartoon spoofing the hiking methods of the various top crews.



Even greater athleticism was shown by Lowell North and Jim Hill on their way to win the 1957 World's. In theory, hiking aids were still not allowed, but it appears the Jim is hanging onto the jib sheet which under strict interpretation of the Star Class rules was not allowed.

Hiking straps were first allowed in 1969. Here we see Dennis Conner with his Menace in 1971 doing a double mini-hike. Check out the crew: not exactly the sort of beef which is represented by most top-level crews today.

The hiking vest was allowed in 1981. The combination of hiking straps and hiking vest have changed completely the physical attributes of the premium Star crew. Paul Cayard observed that at 205 lbs. he was a standard sized crew when he sailed with Bill Gerard in the 1978 World's. Below are Steve Erickson and Paul Cayard on their way to winning the 1988 World's. Steve weighed at the time somewhere in the 240 lbs. range.

Now 250 lbs. is considered to be a little on the light side for a Star crew. The team of Mark Reynolds and Magnus Liljedahl, seen here on their way to win the 2000 Olympics, epitomizes the top flight crews of today.

Mark and Magnus at the 2000 Olympic Trials held on the Berkeley Circle.

BREAKTHROUGH AT THE 1978 WORLD'S

By Paul Cayard

Flying home from Europe recently, I began thinking back over my career and my thoughts focused on my first Star World's Championship. The year was 1978, the venue was San Francisco and the characters are now famous to all of us. For a change of pace I thought I would take a look back at this event. The protagonists are legends of our sport. I think you'll enjoy the story.

At 18 years of age, 6' 2" and 205 pounds, I was the perfect 505 crew. However, Tom Blackaller had taken notice of me and asked me to crew for him in the 1978 Star North American Championship in Toronto as a lead up to the Star World's in San Francisco later that year. I drove the boat from San Francisco to Toronto, cleaned it, rigged it, got it measured and waited for Tom to fly in the night before the first race. Such is the life of a keen young, aspiring, sailor. The championship was not to be as there was no wind to be found in Toronto that year. But I was exposed to the world of "Big Time" sailing. Durward Knowles, Buddy Melges, Bill Buchan, Joe Duplin, Dennis Conner, Lowell North, Ding Schoonmaker and of course Tom Blackaller were all present. So was a lesser-known boat builder named Bill Gerard. As Tom was to sail the Star World's with his regular crew, Ed Bennett, Bill asked me to crew for him and as keen as I was, I said sure.

Star sailing in those days was a "man's" sport. No hiking vests, no self bailing cockpits and sliding track backstays that had to be tacked. What this meant was that the crew was hiked out over the side hanging on by his ankles, pulling on a rope that was attached to a bilge pump and retracted by shock cord, and tacking and releasing the backstays on tracks at each tack. It was a workout to say the least. But because you had to hang out over the side with no support, 205 pounds was not that far off the pace for weight. Of course there were exceptions; Ron Anderson, crewing for Dennis Conner at 275 could hike the whole way and Bill Munster at 285 crewing for Malin Burnham could most of the way.

To say that Bill Gerard and I were underdogs was an understatement. The best Bill had ever done in the World's was 15th and this was my first. But to our good fortune, two days before the World's started, Buddy Melges came up to Bill and, handing him a bag of sails, said "Here, give these a try." We had no idea that we had in our hands was pure speed…an innovation the likes of which comes around once every 10 years in one-design sailing and produces speed that makes a significant difference. The sails in the bag were the first of the heavily yarn-tempered Dacron cloths and cut into the flattest set of Star sails ever seen. Buddy brought five suits to San Francisco; two for himself, and he gave one set to us, one to Ding Schoonmaker and one to our current ISAF president Paul Henderson. Little did anyone know that those five suits would win every race in that regatta. The standard in the class at the time was the North "DC2" main with a "TA4B" jib. "DC" stood for Dennis Conner, the reigning World's champion having won every race at Kiel the year before. But the DC2 would be too full for the strong wind of San Francisco Bay once Buddy Melges came blowing off the starting line in truly a different gear.

In the first three races of the regatta, the story was told. Buddy first, Dennis second and Tom third in each race. Buddy would come off the line and within five minutes it would look like he had started 30 seconds over early. With Andreas Josenhans at 255 holding the boat down and the supper flat supper hard "SF" main, Buddy was untouchable. There was nothing that stalwart Star Champions Blackaller, Buchan and Conner could do to equal Buddy's speed. Through excellent sailing and experience in the class, Blackaller and Conner dragged their extra full sails around the course better than anyone else but Buddy was in a league of his own.

There were 99 boats at the World's that year, the biggest fleet ever to that date. At the first windward mark of the first race five boats sunk, all but one being retrieved off the shallow bottom of the Berkeley Circle. A relatively short 2 mile beat, a shiftless 20-25 knots of wind, and 99 boats was a recipe for carnage. Places 30-70 arrived at virtually the same time. A scene like that had never been seen before. In fact, the first leg of a Star World's race is now 2.75 miles for this reason.

After three races, Ding Schoonmaker gave up on his North sails and went for the Melges sails and proceeded to win the next two races. Buddy finished second or third in each and virtually sewed up the regatta without having to sail the last day.

The last race is a historical one. We were having our best race in 2nd place fighting it out with the current ISAF President, Paul Henderson for the win. Henderson was the better sailor on the day and won the race, the only race he has ever won in the Star World's. I am sure it is one of his fondest memories.

In the final tally, Melges won the World's (the first of two in a row) and his legend continued to grow in yet another class. The win also launched Melges as the boat builder and sailmaker of choice in the Star class at that time. He must have sold 400 suits of sails and 20 boats in the year following his win. Dennis Conner finished second, Tom Blackaller third, Gerard/Cayard fourth and Ding Schoonmaker fifth.

A lot of water has passed under the bridge since that regatta.

THE DEVELOPMENT OF STAR CLASS COURSES

From the very first Star Class Log published in March, 1922, the courses for the major championships have been described by the Class. On page 21 of the 1922 Log there is the following:

COURSES

The course shall be laid out in open water and as far as reasonably possible, away from head-lands, shoals, or other local conditions tending to favor a person possessing local knowledge. The courses shall be triangular and not less than eight nautical miles. One course out of three or two courses out of five, etc. may be to windward and return.

In the 1924 Log the description of championship courses was elaborated upon:

COURSES

The course shall be laid out in open water and as far as reasonably possible, away from head-lands, shoals, or other local conditions tending to favor a person possessing local knowledge.

The courses shall be either triangular or windward and leeward (varied if possible) and sailed twice around, making a total distance of ten nautical miles or more. No fixed marks indicating shoals, rocks, or near shore, such as government buoys, light-houses, etc. shall be used as marks of the course. In the event that the turning marks (stake boats) are not clearly visible from all parts of the course, a marker boat (large boat with a distinguishing flag displayed) shall be used in order to make the marks easy to locate.

The general locality of the courses must be submitted to the I.E.C. for approval, and circulars containing complete instructions as to signals, tides, and course must be furnished to each contestant, including a chart of the course.

In the 1927 Log the description of championship courses was further refined although the basic idea of having either a triangular course twice around or a windward-leeward course twice round remained the basic principal. However, a time limit of 3½ hours was added. This description continued to be used with some minor additions and clarifications up until the 1960 Log.

Starboard and Port Roundings

Mention should be made that marks could be rounded either to port or to starboard, depending on the signal displayed by the race committee boat. Judging from the movies taken of the World Championships from the 1930's through the late 1950's it appears that both roundings were used equally. However, it was very evident in these movies that starboard roundings, especially as the fleets got bigger and more evenly matched, made life really miserable both for the boats coming up on the mark on port and also after rounding making it at times close to impossible to fall off onto a run until the starboard tack boats had passed. Concerning the disappearance of starboard roundings in the late 1950's Bill Buchan has the following observation:

There was a World's, most likely in the mid to late 1950's, perhaps Italy in 1956, where the boats that rounded the weather mark couldn't fall off to go downwind in the face of all the starboard tack boats approaching the mark. I know that when I sailed the Portugal World's in 1962 the Race Committee wanted to have us round the marks to starboard because they felt it was unsafe for the fleet to round on port and then head offshore on the reaching legs into the open ocean. The uproar from the fleet at the skippers' meeting led me to believe that sometime in the recent past there must been an experience that left an indelible impression on those skippers that were there as they wanted no part of any racing that called for starboard roundings. The RC dropped the idea then and there and that's the last time I ever heard of it being brought up.

The Gold Cup Course

In the 1960 Log there was the first major change in course description since the Logs first came out. Only one course, called at the time "the Gold Cup Course", now Course 1, was to be used at the World's Championship. The course description read as follows:

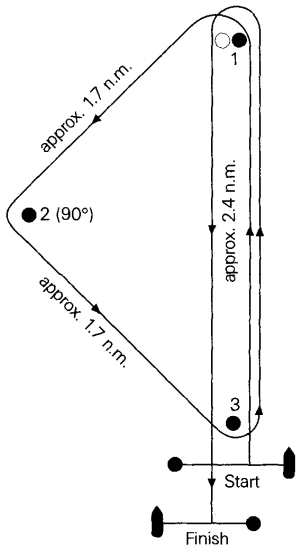
2. Races shall be held in open water as free as possible from headlands, shoals, obstructions and aids to navigation. Aids to navigation, unless otherwise specified, must be left on the required or channel side.

3. The course shall be an isosceles triangle, followed by a windward and return which is accomplished by omitting the right angle mark from the triangle on the second round, totaling approximately ten nautical miles. The course can not be shorten.

Course "1"
approx. 10.6 n.m.

Start
1
2
3
1
(or 1 + offset mark)
Finish (downwind)

○ = optional offset mark



The Addition of Other Courses

By 1962 it was recognized that for A (now called "Silver") events and below sometimes the waters of the

host club could not be run on such a course. The Gold Cup Course became designated as Course 1 in the 1962 Log and the present Course 2 was introduced as an alternative course for events taking place on restrictive waters.

Course "2"
approx. 10.1 n.m.

Start
1
2
3
1
(or 1 + offset mark)
3 (or gate 3A – 3B)
1
2
3
Finish (upwind)

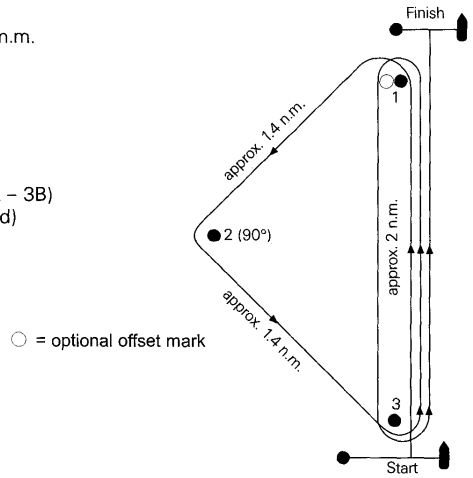
The same Course as Course "0" but the distance between Marks 1 and 2 resp. 2 and 3 is approx. 0.9 n.m., between Marks 1 and 3 approx. 1.3 n.m., one triangle in addition.

Course 2 may not be used at AA events, and may only be used at A events with approval of the continental commitee. (STCR 34.3.1).

Course 0, known as the "Olympic Course" was added to the list of possible courses in the 1969 Log.

Course "0"
approx. 10.8 n.m.

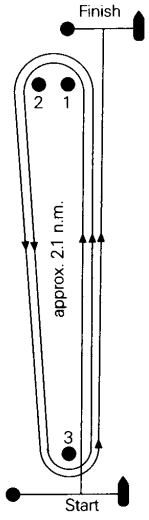
Start
1
2
3
1
3 (or gate 3A – 3B)
Finish (upwind)



Course 3 was added in 1975 but it was not until 1994 that Course 4 was added.

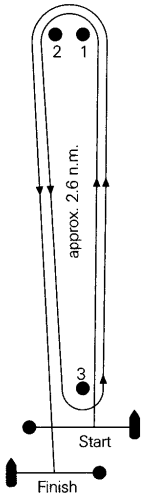
Course "3"
approx. 10.5 n.m

Start
1
2
3 (or gate 3A-3B)
1
2
3 (or gate 3A-3B)
Finish (upwind)



Course "4"
approx. 10.5 n.m.

Start
1
2
3 (or gate 3A – 3B)
1
2
Finish (downwind)



It should be noted that theoretically for all of these courses the marks can be rounded either to starboard or to port since the direction of rounding is not specified in the course descriptions given in the Logs. However, in the 1996 Log illustrations of the five Star Class courses appeared for the first time, and in these port roundings are shown.