

PAINE 46 *MERIDIAN*

DIMENSIONS

LOA:	45' 7"
LWL:	39' 8"
BEAM:	12' 7"
DRAFT:	6' 0"
DISPLACEMENT, 3/4 load:	23,670 lbs
BALLAST (lead):	10,180 lbs
SAIL AREA (100% foretriangle):	909 sq ft
SAIL AREA/DISP RATIO:	17.64
DISPLACEMENT/LENGTH RATIO:	178



MERIDIAN didn't know how to go slow. Note the full length slat bulwarks.

MERIDIAN was the first of our "Bermuda Series" of high speed offshore sailing yachts. She was built by the Concordia yard in South Dartmouth, Massachusetts. A second yacht to this design *G-FORCE* was built of aluminum by Kanter Yachts of St. Thomas, Ontario. *G-FORCE* completed a circumnavigation and now lives in New Zealand. Steve and M.E. Taylor are CCA members who simply love *MERIDIAN*. For years I tried to interest them in a larger version but they had the wisdom to stick with what worked for them. If you find either a boat or a wife that pleases you the most foolish mistake you can ever make is to try to trade up.

In designing *MERIDIAN* Steve and I were influenced by the reactions to the Fastnet disaster favoring narrower, lower center of gravity hull types. At the same time we both viewed many of the lessons learned in the BOC and Globe Challenge singlehanded round the world races as directly applicable to a shorthanded high-seas sailing yacht. Bostonian Steve Taylor provided the opportunity and budget for me to design my first truly high performance sailing yacht.

In conceptualizing the Bermuda Series we recognized Steve Dashew's excellent work along the same lines, which had resulted in a series of yachts (the Deerfoot/Sundeer line) aimed at a similar target. Dashew can be credited for exploring the virtues of a relatively narrow, light displacement, long waterline, nearly plumb-stemmed hull shape devoid of any of the distortions required for racing. We added to the concept the use of a much lower center of gravity bulbed keel and updated the construction method to epoxy, high modulus unidirectional fiber vacuum bagged cored

composite construction. *MERIDIAN's* stimulating performance throughout her extensive trials and two subsequent transatlantic voyages including 8.8 knot speed under power, consistent nine to ten knot runs under sail, and very upright sailing angles clearly proved her design concept.

The design began with extensive VPP analysis. Performance was run in both half load and full load conditions, and the weight study itself occupied over one man-month at a computer keyboard. Even in the fully loaded condition, speeds just short of ten knots were predicted in 20 knots of true wind. Heeling angles were predicted to be low without any crew action, a result of the aggressively bulbed keel design. *MERIDIAN's* keel sported solid lead wings which added stability (and drag), while *G-FORCE* used a more conventional "Paine Keel". Of the two, I believe the latter was the better choice.

MERIDIAN's construction utilized vacuum bagged epoxy employing a combination of fiberglass and kevlar in the skins over a one-inch closed cell foam core. The resin matrix was pure epoxy, requiring that the hull be post-cured in an oven to prevent post-curing in the sun. We designed the moment of inertia of the skins well in excess of ABS standards in all areas since impact with flotsam could be expected at some time far from hope of rescue. Not only was the basic shell of exotic construction but the overall design philosophy was similar to the approach used on all-out racing yachts. There were no matched flanges nor fastenings at the hull to deck joint. The hull and deck were mated together, radiused, and epoxy-glassed inside and out to create an absolutely leakproof monocoque structure. One feature that I pushed for, and love to this day, is the full length bulwark boards that are completely separate from the deck, supported by the lifeline stanchions, and are both highly practical from a safety point of view, and real cool to look at.

The final rudder is supported by a massive braided carbon fibre rudderpost, and is of large area with a boring but predictable "NACA 00" foil. The owner at first tried for a "breakthrough" rudder foil, hiring hydrodynamicist Dave Vacanti to design it. When I first saw the drawings and in particular the foil which was very fat and had its point of maximum thickness halfway along the chord, I said, "you sure ain't gonna steer a boat with that thing!" Sometimes years of experience trumps mathematical theory, and in this instance I was regrettably right. The second rudder steered beautifully.

The interior is easily understood from the drawings. There is a large combined head and shower room immediately adjacent the companionway. The idea was that the retiring watchstander could immediately freshen up with a brief freshwater shower before enjoying the off watch, so the shower room is more akin in size to a shoreside bathroom than a marine head compartment. Opposite is the offshore cabin with a divided double berth which converts into two separate narrow seaberths for passagemaking. The galley is of conventional design, but features overhead cabinets aft to increase stowage volume. The navigation and conning area to starboard is large, with an oversize chart table and seat which enable the yacht to be steered from an elevated seat by toggling the autopilot. The owners' at-anchor stateroom features a double berth with stowage beneath, and lockers and stowage to starboard. In the forwardmost quarter of the hull is a deck accessed stowage room with bins for extra sails, and racks for the owners' mountain bicycles, extra anchors and line, etc

The sail plan was of modest area thanks to the light displacement. The very high aspect ratio foretriangle reduced the genoa overlap. I have never been converted to the position where I would favor the overly tall mast required when a genoa is not used, though some of my customers have forced me in that direction. The mainsail was large and powerful and had full-length battens. This was the beginning of my well-known campaign against mainsheet travelers, which I consider dangerous on a cruising boat. Two mainsheets, one port and one starboard, were fitted so the boom could be placed wherever desired, though it did mean quite a lot of spaghetti on the cockpit floor. We developed simpler solutions on subsequent designs.

The yacht could be sailed staysail at respectable speeds with the small non-overlapping staysail in anything over 20 knots true wind speed.



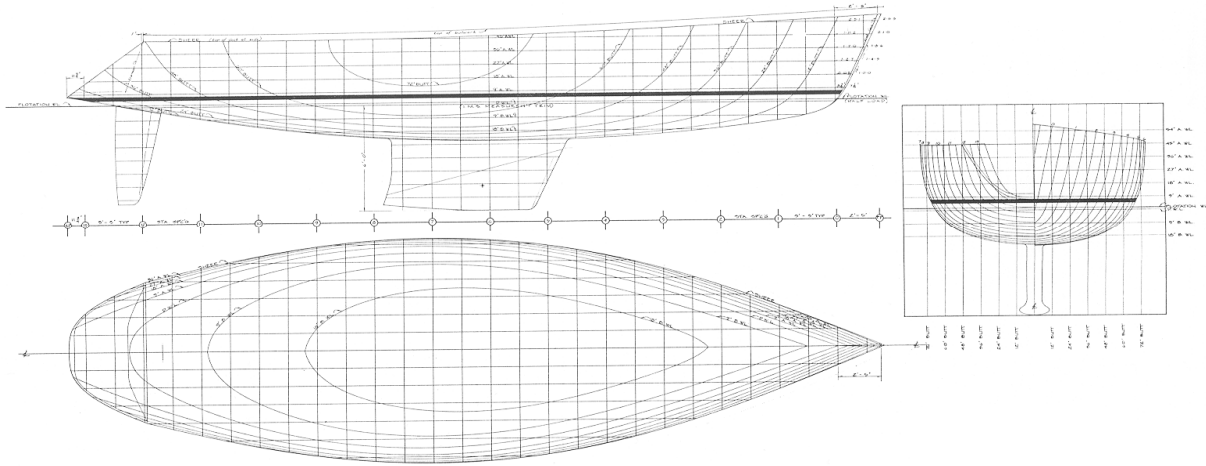
M.E. Taylor could steer her one-handed even at a speed of nine knots.



Concordia did lovely joinerwork in Honduras mahogany. Everything was much lighter in weight than it looked.



The structural arches in way of the mast enhanced the interior décor.



With her narrow stern she didn't bury her bow when she heeled. Of the two keels I favor this one.

For plans or further information contact Mark Fitzgerald: mark@markfitzmarine.com

