How Bluenose Was Designed

By W.J. Roué (Published December 30, 1923 in the *Halifax Herald*)

In this noteworthy article the genius who designed the world famous fishing schooner 'Bluenose', tells how that ship was designed. Mr. Roué goes back to the earliest days in schooner building and traces the development of that type of vessel. His remarks on the difference between Gloucester and Nova Scotia types and the necessity for stringent racing rules will interest many. So far as possible the writer has avoided technical terms and with those used the majority of Maritime readers will be familiar.

A schooner is a fore and aft rigged vessel. A topsail schooner has yards on her fore mast and sometimes on her main-mast, but no courses.

It is claimed that the name "schooner" originated in America in 1713 in this way, - Andrew Robinson (probably a Scotchman) built a vessel at Gloucester, Mass. At the launching as the vessel took the water a spectator was heard to remark, "How she scons." Robinson on hearing this said, "A Schooner let her be." Webster in his dictionary says that story is well authenticated and eight years later Moses princes referred to Robinson as the "first contriver of schooners." Webster says the man said "How she scons" because the Scotch word is to skim as a flat stone will when thrown upon the water. It was just as probable that the name 'schooner' was derived from the Dutch 'schoone' pronounced 'schoona' meaning – clean, elegant, fair, beautiful, etc. Webster without giving any authority says that the German "schooner" the Danish "skooner" and the Spanish "escuna" were derived from the English or from the Scotchman who built the "schooner" in Gloucester, Mass. It is possible that the term was used before Robinson used it, but he is generally given credit as applied to vessels of two masts, both of which are fore and aft rigged.

The fishing vessels of Nova Scotia thirty years ago were deeper and of less breadth than those of fifteen years later. It was found that the deep narrow vessel required a large amount of permanent ballast, thereby cutting down carrying capacity and was not suitable for freighting trips in the winter months, and not easy to dispose of as coasters when their life as a fisherman was over.

They also sailed at a rank angle of heel, making living aboard anything but pleasant. A later development produced vessels of the "Delawana" type. These vessels with their short over-hang forward and moderate depth were fast off the wind, fair to windward, good all round vessels for fishing as carried on in Nova Scotia.

The next type was the knock-about. Vessels of this type should have proved very efficient for our fishing, as everyone is bound to acknowledge that a vessel without a bowsprit is a much better one to ride at anchor than a bowsprit vessel. But the type of broad flat hull of great natural stability requires more sail than can be put on a vessel without having too high a rig, which is not good practice with inside ballasted vessels. Besides vessels of this type are generally hard to steer as the centre of effort is a rule too far aft making the vessel in some cases round up in the wind in spite of the rudder being across the boat's course. Of course this could be obviated by having the centre of lateral resistance relatively far aft. This, however, might make her too light headed so that she would be inclined to have the bow knocked off to leeward when beating to windward in a heavy head sea.

It appears that the early Gloucester vessel was not a desirable type. Almost any of the older captains out of Gloucester will tell you that since the introduction of the Burgess type of vessel they have had no losses through stress of weather. The inference is that before the Burgess type they had sustained loss other than fire and running aground. Edward Burgess was no doubt the originator of the present type of Gloucesterman.

The radical differences between the Nova Scotia vessel and the Gloucesterman is that the Gloucester vessels that are built for sailing only, are somewhat narrower and deeper, carrying a great amount of

permanent ballast. They are used for fishing the entire year and a great majority fisg under sail; that is, the vessel jogs while the dories are away fishing, sailing around and picking them up at nightfall.

The Gloucester vessels are much lower in freeboard than the Nova Scotia vessels, consequently very wet in rough water. They are better sailers to windward than our vessels are as a whole, but in strong breezes are no faster off the wind, if as fast. The Gloucester vessel being built of white oak and southern pitch pine have a much longer life than our vessels, but they are at best no stronger in construction, better built or rigged.

The International Race

In the early Fall of 1920, W.H. Dennis was inspired with the idea that it would be a good thing for the fishing industry of this province to have a race between vessels of the salt banking fleet. Acting upon that inspiration he put up the Herald and Mail Trophy for the championship of the Nova Scotia Fishing Fleet. Eight vessels competed and the Race, Cup and Championship were won by the schooner "Delawanna," and eight-year old vessel, over the latest knock-abouts. This proved that the design of the fishing vessels out of Lunenburg and LaHave had not improved as far as speed was concerned in the preceding eight years. Shortly afterward The Herald and Mail International Fishermen's Trophy w put up for competition between fishing vessels of the Atlantic. Gloucester responded with the "Esperanto." Our defeat at the hands of that ill-fated vessel is still fresh in our memory. The "Delawanna" did very well off the wind, but could do nothing beating to windward against this type of vessel, so the cup was carried to Gloucester.

The Bluenose

After the defeat of the "Delawanna" by the "Esperanto" it was felt that we had no vessel of the "Esperanto" type on the wind. It was decided that if we ever hoped to have a fighting chance, something new and different would have to be built. When the order was given me for the design, it was clearly pointed out that the new vessel must have all the carrying capacity of the largest Knockabouts and have the smallest amount of permanent ballast consistent with safety. In fact the vessel would have to be a paying proposition either fishing or freighting.

Having the figures before me as to the wright of fish or freight that the vessel was expected to carry, the weight of the hull, spars, sails, rigging and stores, it was found that at normal water line of 110 feet, 270 long tons of displacement was required. The next thing was to work out the proper distribution of displacement so as to cause the least resistance. It is known that a certain ratio of increasing progression of under-water bulk to the point of greatest transverse area at about 55 percent of the water line length aft of the stem and decreasing bulk from that point aft causes the least resistance to bodies moving through the water at the surface. This is called the "wave form theory" and all modern yachts adhere closely to it. The theory is that the water is excavated by the fore body of the vessel when she is moved through a fluid carried away to infinity (not the actual particles, but a corresponding bulk), by a solitary carrier-wave, or wave of translation; and that the cavity formed by the greatest cross section as the body moves head is filled up by a wave of second order, or the common oscillating wave of the ocean. Therefore, the fore body should be shaped in length and distribution of displacement to correspond to the form of a carrier wave of equal length, or a curve of versed sines; the run of after body to the length and shape of the front of an oscillating wave or trochoid. If so informed, the ship will meet with the least resistance in her progress. The Bluenose is designated to conform to this theory; in other ways she is a combination of the Gloucester and Nova Scotian vessels, having the depth of the former and the breadth of the latter.

This combination has worked out happily as she has proven herself to be at least as fast as any Nova Scotian vessel off the wind, and faster that any Gloucesterman that she has met on the wind. Captain Walters tells me that she is the driest vessel at anchor or under sail that he has ever sailed on.

Special Features in Bluenose Design

The Bluenose has demonstrated that vessels can be built having the breadth and carrying capacity of the Nova Scotian vessels; the depth and windward qualities of the Gloucesterman and still be reasonably fast. The outcome of the races (with sane rules to govern) will be the production of vessels of great speed and sea going ability, vessels that will make the name of Nova Scotia what it was in former years in the maritime world when our ships were known in all ports of the world. Be it known that inside ballasted vessels have not been designed or built to sail in competition with one another since the advent of outside ballast of yachts; therefore the chance for improvement is great.

Reason for Racing Rules

No one would expect an automobile of 2,000 pounds weight and 50 horse power to compete with one of the same horse power and 500 pounds less weight. It must never be supposed that the intention of the donor of the trophy was to encourage the building of the fastest vessels within a given length and limit of sail area. The idea is to produce better and safer fishing vessels, faster if possible, with the same bulk or displacement as is usual practice. It would not be very hard for any designer to make a vessel of say 110 feet water line, 220 tons of displacement and 10,000 square feet of sail, faster than one of the same length and sail area but of 280 tons displacement; and the safety of vessels at sea is mainly due to a fair proposition of displacement to water line lengths coupled with good breadth and freeboard. These features also produce just what we want for our fishing vessels.

That limit of sail area of 80 percent water line length, squared, was arrived at only after extensive research into sail areas of well-known sea-going vessels with inside ballast. The displacement rule was made to prevent the building of very light displacement, which would be totally unsuited to the fishing industry and not safe. After consultation with some of the foremost designers the following displacement rule was adopted by the trustees; that the cube root of the displacement in long tons must never be less than 5.8 percent of the measured line; this is a compromise between the Nova Scotia and Gloucester types. It may be a surprise to many to know that the modern racing schooner yacht has a larger ratio of displacement to water than this limitation provides. It has been clearly shown during the short time these races have been held that the spars are in some cases getting too high, so for safety to the crews a limit has been put on them and as a fair amount of breadth is to be encouraged, it is used as a factor in obtaining the height limit. Thus, the following rule has been introduced by the Trustees: that the height from deck to main-top-sail halyard block band shall never be more than the sum of one-half the water line length plus twice the greatest water line breadth plus the constant of 10.

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W. J. Roué was among the Trustees of the "The Halifax Herald's International Fishermen's Trophy" as designated in the Conditions of Deed of Gift as created by William H. Dennis, representing the proprietors of "The Halifax Herald and The Evening Mail newspapers. Other Trustees included: The Honourable Premier of Nova Scotia, His Worship the Mayor of Halifax, Messrs. H.R. Silver, H.D. DeWolf, R.A. Corbett, H.G. Lawrence, F.W. Baldwin, and Capt. V.C. Johnson. An International Committee of Five was elected for each series consisting of two members to represent Nova Scotia, two members to represent the Unites States, and a Chairman named by the two members representing the country in which the Race was to be held (alternated between Halifax and Goucester).