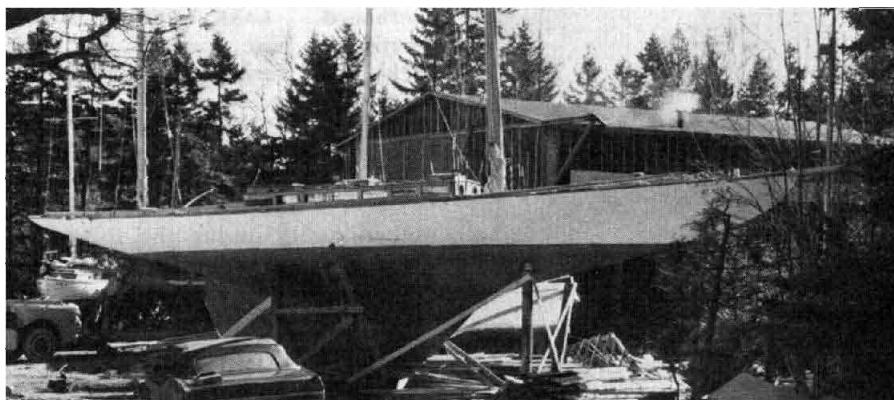


## Holding the Shape the Herreshoff Way



Each winter for years DESPERATE LARK has been stored outside with masts in place and her bow and stern unsupported. She's nearly 80 years old and her sheer is still perfect.

What makes a boat last—and last—far beyond her normal life expectancy? Is it durable materials? Classic good looks? Continuing usefulness? A series of good owners? Money? Luck? Perhaps it is all of the above in some magic combination. But one sure-fire way longevity is jeopardized is when a boat's sheerline becomes hogged. There are few sailors who want to own a boat with a hump in her sheer or a boat whose stern has drooped like a piece of wet spaghetti. There is no amount of gleaming varnish or elegant joinerwork which can compensate.

Many turn-of-the-century sailing yachts were long-ended, low-sided, deep-keeled craft that carried large spreads of sail. Inherent structural stiffness was minimal. There were hundreds and probably thousands built to this style—just look in any yachting magazine of the time—yet

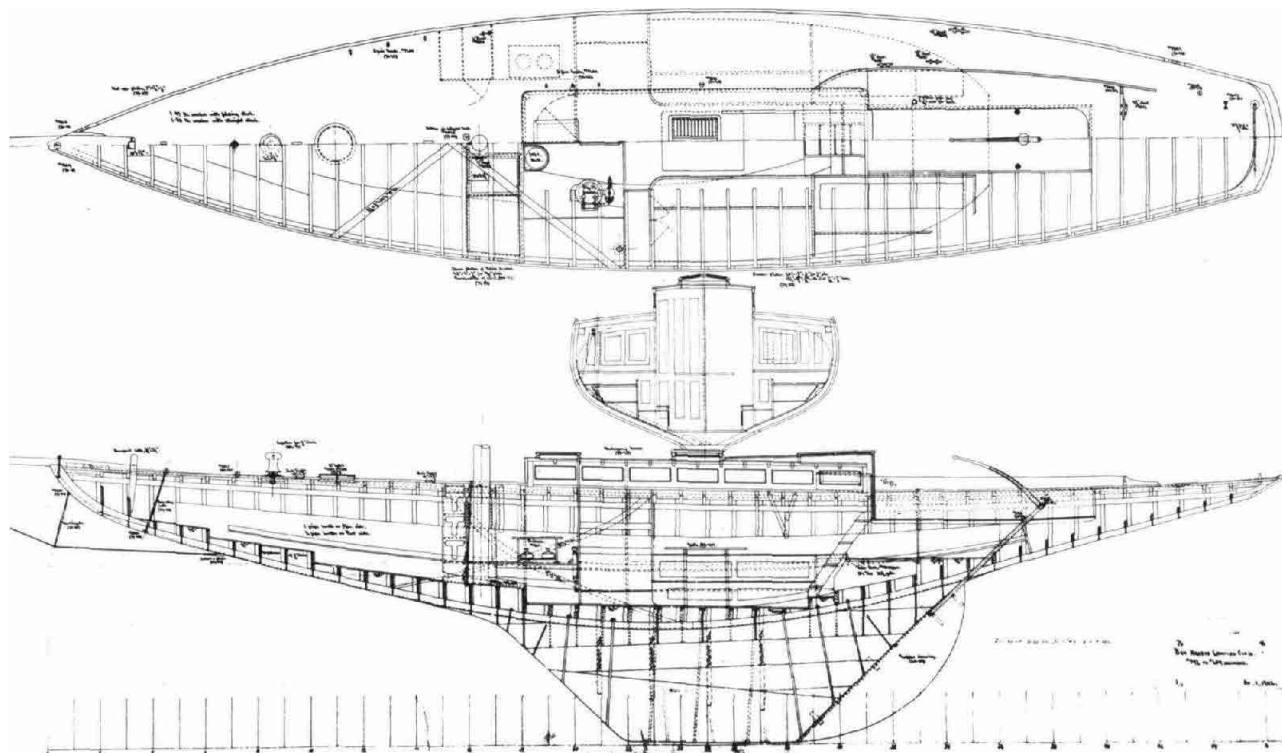
few boats made it even to 50 years of age. Hogging was a common fault and was a key factor in their demise.

There were exceptions, and the boats from the Herreshoff yard at Bristol, Rhode Island, were one of them. N.G. Herreshoff had had many years of experience in putting together wooden hulls so they wouldn't flex or change shape, and by 1900 had worked out some fairly standard strength-giving features which were incorporated in most of his long-ended wooden sailing craft. Most of his designs were handsome to begin with, and because they were strong enough to retain their original shape over the years, Herreshoff boats always wound up with more than their share of good owners. Of course his boats had other sought-after attributes as well; I don't mean to belittle their other features in the least when I say that the ability of Herreshoff boats to keep a fair hull

and a fair sheerline was a key to their long life.

How in heaven's name is it possible for a long-ended boat to hold her shape year after year? The hull holds up the heavy lead keel when she's overboard; the keel holds up the hull when she's hauled out for storage. She shrinks in winter and swells up again in summer. There are the stresses of sailing in heavy winds and rough seas. And old age is always a factor.

Like most of Capt. Nat Herreshoff's work, his solution to the hull stiffness problem was simple, fairly inexpensive, and most effective. The 13 boats of the Bar Harbor 31-foot class of 1903 (49' overall) are a good example. But there are others. Take two other Herreshoff one-design classes of 30' waterline length, for example—the Buzzards Bay 30s of 1902 (47' overall, 14 boats) and the famous New York 30s of 1905 (43½



Courtesy Hatt Nautical Museum, MIT

overall, 18 boats) which were featured in WB No. 35. I know of four or five Bar Harbors, five Buzzards Bays, and an astonishing 13 New York 30s that are still in existence, and while to be sure there are a few basket cases among them, the sheerlines of these craft still look good.

Shown here is the construction drawing for the Bar Harbor 31-foot class, the most extreme of the above-mentioned designs. Let's take a look at what gave these craft their long-term hull stiffness and kept their hulls from going out of shape.

**Double planking**—Double-planked topsides with both layers running fore and aft and their seams staggered so they could be screw-fastened to each other as well as to the boat's framing formed a rigid skin which, once built, resisted any change in its shape. Because Herreshoff always built his hulls upside down where working on them was convenient, an extra layer of planking was no big deal, and any Herreshoff boat over about 35' in overall length was generally double planked.

Tight seams (without caulking, that is) were used for both inner layer and outer layer. The outer one was the thicker of the two so it could be bunged and was bedded against the inner one in heavy shellac. Back fastening between the frames from the inside held both layers together and made the completed skin rigid. This band of double planking covered about two thirds of the hull, extending from the lower edge of the rabbeted sheer strake to well below the turn of the bilge where its outer layer likewise lapped onto the rabbeted edge of the first strake of single thickness planking. Smooth topsides with seams which stayed so tight as to be nearly invisible were another benefit of double planking and a trademark of Herreshoff.

**Diagonal metal strapping**—Metal (usually bronze) strapping, running diagonally from rail to keel, let into the frames where it crossed them, and fastened to the inside surface of the planking, kept the hull from twisting or wracking under the opposing forces of the rig and the ballast keel. Similar strapping crossed the deck in way of the mast. Herreshoff always used this metal strapping, in one form or another, in the bigger boats with deep heavy keels to supplement the double planking.

**Oak, teak, or hard mahogany sheer margin**—The sheer strakes and covering boards were usually oak (and sometimes of hard mahogany or teak) well screwed together to form, in

effect, an L-shaped longitudinal tie which ran along the sheer from bow to stem on both sides of the boat. These ties or margins, spread as they were by the deck beams and well connected to the breasthook forward and to the quarter knees aft, resisted any elongation of the hull at deck level—a frequent cause of drooping bows and sterns. On the Bar Harbor class, the sheerstrake butt block is through-bolted rather than screwed to further strengthen the sheer margin assembly. And of course this assembly was stiff enough to prevent any local unfairness from developing in the boat's sheerline from the pull of rigging. Being of a stiff dense wood it held fastenings well, and the toe rail, the bow and quarter chocks, pad-eyes, and other things that were attached to it stayed put. Nearly all of Herreshoff's decked boats had this feature, whereas in other craft one might find softwood sheerstrakes and fore-and-aft laid decks that ran right out over them with no covering boards at all.

**Hull framing held fast at its ends**—Looking at a transverse section through the hull, one can easily imagine the hump in the sheer that would occur if the frames were to straighten out appreciably. Yet, with the mast and ballast pushing down at

the centerline and the rigging pulling up at the rail, that is the tendency. Herreshoff kept his frames from changing their shape by securely bolting or riveting their ends to something secure; the frame heels were fastened to floor timbers and the frame heads were locked between and bolted through the clamp and sheerstrake. Above the clamps, the frames were fastened to the outboard ends of the deck beams. There were hanging knees to further hold the frame heads in place—six pair of them on the Bar Harbor class, for example, located on the frames nearest the mast and over the ballast keel where most of the stress comes. Structural bulkheads are, of course, another means of holding the transverse shape of a hull, but Herreshoff rarely used them in this type of craft—probably because he felt they were a needless complexity and wouldn't integrate well with his practice of using continuous bow to stern hull ceiling.

**Sheer clamp**—The sheer clamps, which ran from bow to stern at the intersection of the deck beams and frames, acted as continuous knees to help hold the angle there from changing, since both the beams and frames were bolted to them. Besides this, the sheer clamps were well secured to the

stem and stern and helped keep them from sagging; that is, the clamp served as a longitudinal strength member up high in the boat where that kind of strength was needed.

**Moderate rigging loads**— Although not unique to Herreshoff boats, the turn-of-the-century sail plans with their large gaff mainsails and relatively small jibs were, compared to the tall go-fast rigs of today, easier on the hulls that supported them. There was far less need back then for a tight jibstay, since those early boats with big mainsails weren't very dependent on a headsail for their speed. The short masts that went with

the gaff rig meant better lead angles for the shrouds and correspondingly less load on them. Less tension in the standing rigging meant less compression on the mast and less push against the mast step. The highly stressed, high-aspect, large-headsail modern rig, sailed hard, is a sure way to pull even the finest old hull apart.

One might think, after reading the above, that the features which gave Herreshoff boats so much strength would take up a lot of space and be heavy. What continually amazes me about Herreshoff is that these key strength-giving elements are light-

weight, small in size, beautiful to look at, and simple to build. A truly marvelous combination.

There is more about the construction of a Bar Harbor 31 and other boats from that yard that is worth knowing. Not only the features that make them strong and long-lasting, but the details that make them look so beautiful. The way the paneled doors and bulkheads are built, for example, is a study in itself. N.G. Herreshoff must have had the following guidelines always in mind as he went about the business of designing, and because his blend of these ingredients was consistently near perfect, he is still thought of by many as the best in the business even though he's been dead for over 40 years:

- Make the boat sail fast and handle well.
- Make the structure light and put the weight thus saved into ballast.
- Build things strong enough so they won't break—but just barely so.
- Keep things simple and design things that can be easily built.
- Make everything you design pleasing to look at.
- Use long-lasting materials.
- Put it all together with good workmanship.

**Bar Harbor 31-footers**

LOD	48'10"
LWL	30'9"
Beam	10'4"
Draft	7'3"
Sail area	1,425 sq ft

<b>Hull No.</b>	<b>Original Name</b>	<b>Original Owner</b>
592	KUWANA	John B. Trevor
593	ASTRILD	Henry L. Eno
594	ZARA	Joshua M. Sears
595	JOKER	H.M. Sears
596	BAT	Edgar T. Scott
597	BEN	A. Y. Stewart
598	CURLEW	R.H. Gallatin
599	INDIAN	W.C. Allison
600	FLIGHT	E. deV. Morrell
601	REDWING	T.G. Congdon
602	CRICKET	F.G. Ladd
603	SCUD	A.J. Cassatt
604	PAPOOSE III	V. Everit Macy

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