Gallant Performer

by Garry Hoyt

For fast, efficient, hassle-free sailing, the Gallant rig is a little-used option well worth exploring.

The concept behind the Gallant rig — shown here on a British-built, prototype 29-foot racer/cruiser called the Gallant 29 — is that a proper sailing rig should ideally be a clean aerodynamic wing that can easily be hoisted, lowered, or reefed. Englishman Jack Manners-Spencer has been faithfully promoting this project for a number of years, and the simple logic of his proposition deserves examination. By way of review, aerodynamic theory and sailing practice have taught us:

1. That rods, wire stays and mast interference disturb air flow over the sail. The freestanding Gallant rig is free of those impediments.

2. That the elliptical planform is the most efficient shape because it minimizes vortex drag and produces a better lift/drag ratio. For conventional rigs, the triangular shape created by the forestay and the backstay is in fact the worst shape available. The Gallant planform is close to optimum.

3. That sail twist robs a sail of power and it is difficult to avoid twist on the Bermuda rig — particularly in the case of the genoa jib. The Gallant rig does not twist significantly.

On all three of these counts the Gallant rig delivers clear improvements over the prevalently popular Bermuda rig. The Gallant rig works by enclosing a square, rotating mast with a two-surface sail envelope that is internally supported by symmetrical plate battens that slide up and down the mast. The square shape of the rotating mast is fitted to a matching square hole in each batten plate, which ensures that the mast, battens and sail all turn integrally.

With a waterline length of only 23' 6", the Gallant 29 has recorded an impressive top speed of 13 knots in surfing conditions.

The semi-balanced shape of the rig allows it to turn more easily — like a semi-balanced rudder — because part of the sail area is ahead of the point of rotation. This means that sailhandling is automatically easier, and normally tricky maneuvers, like the jibe, are considerably softened. (Instead of slamming violently over, the boom on the Gallant rig moves across the deck more gently because the forward part of the sail, in effect, "brakes" the swing.) This semi-balanced feature also enables the Gallant rig to be trimmed by turning its mast base, thus eliminating the need for sheet lines. This is an impressive list of advantages. But wait a minute, how can a symmetrical sail work? Neither a regular sail, nor a bird's wing, nor an airplane wing are symmetrical foils. They are, instead, "arched asymmetrical foils." So how can a sail that is shaped the same on both sides be as effective in producing lift or sail drive?

The answer is that the symmetrical foil or sail — curved out equally on each side — is not quite as effective as the asymmetrical foil in producing lift. But, the loss in efficiency is very slight — much less than you would imagine. It is really much more a problem of perception than one of significant performance differences. And while our eyes are accustomed and attuned to the presumed efficiency of thin foils — like sails — thick foils are actually more effective in producing lift.

By way of confirming this, the Gallant rig was tested in a wind tunnel at Southampton University, and showed better performance ratings than a conventional rig of similar size. But it is what happens out on the water — on a boat and in a breeze — that matters. And while Jack Manners-Spencer is hardly a neutral observer, he reports some interesting results from racing with the Gallant rig.

"A Gallant-rigged cruiser/racer, the Gallant 29 was campaigned in a series of inshore and coastal races, plus one ocean race to France and Ireland. She was first across the finishing line in three of the events and received a prize for third overall in the inshore series. These results were particularly impres-

sive considering that the light-wind conditions that prevailed were not her most favorable scenario because her hull was designed to achieve planing speeds in stronger winds.

"The only condition in which the Gallant 29 was at a slight disadvantage — for the above reason — was beating to windward in winds of eight knots or less. As soon as the wind piped up, windward performance at least equaled other conventionally rigged boats, and in very strong winds it proved to be better. (On reaches), the Gallant rig proved to be superior in all wind strengths, even when other boats were flying spinnakers. On downwind (legs) the Gallant rig (also showed a performance edge) versus Bermuda-rigged boats, except when they set large spinnakers in very light conditions."

In addition to the above testimonial, Manners-Spencer reports a notable 200-mile passage from The Solent to Harwich on the east coast of England in Force 4 to 6 winds (approximately 11 to 27 knots). The Gallant 29 averaged 6.5 knots overall for the passage, and completed the last 100 miles at an average speed of 7.5 knots. The best speed recorded in flat water was 11 knots; surfing in waves brought a top speed of 13 knots. For a boat with a waterline length of 23'6", these are notable speeds.

In addition to an impressive list of advantages, the Gallant rig is easily and efficiently reefed.

I can see a number of advantages to this rig, both for yachtsmen and for larger commercial sailing vessels. I question whether a cat rig on a displacement boat can ever point as high as a jib-headed boat, but for overall cruising utility the ease of handling and better offwind speed should more than compensate for that deficiency. This seems to be one of those ideas that deserve much wider acceptance than it has received to date. It is curious to see how the web of rules, traditions, and nostalgia seem to enmesh and immobilize promising new ideas that present themselves to the sailing world. An apparent lack of development funds has hampered Jack Manners-Spencer's promotional efforts with this rig; but, for quiet, simple, swift sailing, I see the Gallant rig as a very promising development.

"The Need for Speed" welcomes submissions from designers, builders, and sailors seeking new speed solutions.