Parts of the Ship

Masts and Spars

The brigantines each have two masts, the foremast and the mainmast. The foremast is composed of two pieces, a lower mast and a pole topmast. The upper part of the pole topmast is referred to as the topgallant mast. On larger vessels, the topgallant mast would be a separate spar. Crossing the foremast are four spars called yards. From bottom to top they are the fore yard, the fore lower topsail yard, the fore upper topsail yard and the fore topgallant yard. At the bottom of the foremast on the after side is a spar called the main staysail boom.

The mainmast is also made of two masts, the main mast and the main topmast. By convention we may also refer to the upper part of the main topmast as the main topgallant mast. The main mast has two spars on the aft side that lay nearly horizontal. The lower spar is called the main boom and the upper spar is known as the main gaff.

On the bow of the brigantines is the last spar, called the bowsprit. All of the masts, booms and yards can be collectively referred to as spars.

Standing Rigging

The masts and spars are supported in place by the standing rigging. It is different from the running rigging, which is used to set and douse the sails.

The standing rigging is made of galvanized wire rope, much of which has been parcelled and served to protect it from weathering and chafe. Supporting the masts from the forward side are stays. They take their name from the mast that they support. The forestay supports the foremast; the mainstay supports the mainmast, and so on.

Have you ever noticed that when some one first comes aboard a vessel such as ours their first words are often an expression of awe and amazement coupled with the question -- "How do you ever learn how to sail a boat like this?" And yet, nearly every person who has ever been to school is confident that they know all about teaching. The truth of the matter is that it is infinitely simpler to learn to sail a complicated vessel like a LAMI brigantine that it is to effectively influence a teenager's view of the universe and his or her role in it.
Supporting the mast from the aft side are *backstays*, again taking their name from the mast they are supporting. *Athwartships*, the masts are supported by *shrouds*. The *lower shrouds* support the lower masts and the *topmast shrouds* support the upper masts.

The shrouds, in turn, have horizontal ropes called *ratlines*, interspersed with wooden or metal *sheer poles* and *battens*. At the top of the mast are steel rods, called *futtock shrouds* that are attached on the bottom of the mast to a *futtock band*. The *futtocks* spread outward and upward to the *maintop* and *foretop* and become the lower attach points for the topmast shrouds.

In addition there are lengths of served wire rope, called *cranelines*, that stretch *athwartships* between the shrouds of the foremast to provide a standing place for furling the *staysails* that set between the masts.

Other pieces of standing rigging include *yard lifts*, *boom lifts*, *footropes* and *stirrups*. 

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*Fig. 1: Supporting Rigging Details*
Sail Plan

Main Gaff Topsail
Main Topgallant Staysail
Main Topmast Staysail
Fore Topgallant
Fore Upper Topsail
Flying Jib
Fore Lower Topsail
Foresail (Course)
Inner Jib
Outer Jib
Fore Staysail
Mainsail
Main Staysail
Even though most of our kids are organized as school groups we do not present ourselves as an extension of school. Rather, we operate as an extension of family.

Sails and Running Rigging

The brigantines each carry a set of thirteen sails, although only a maximum of twelve will be set at any one time. The reason for this is that the fore staysail and the fore course would interfere with each other if both were set. Therefore, when the fore course is not being used the fore staysail will be set, and vice versa. All of these sails are set, doused and trimmed by means of their running rigging.

Square Sails

Square sails are rectangular sails set from yards which pivot about their middle.

Each brigantine has four square sails set on the foremast. From bottom to top they are the foresail (course), lower topsail, upper topsail and topgallant.

The square sails are made of dacron in vertical panels. They have four corners. The upper two corners of the sail are called the earrings; the lower two corners are called the clews. The top edge of the sail is called the head; the bottom edge is called the foot. The outside edges are called the leeches. The middle of the sail is referred to as the bunt. Along the head of the sail are cringles, which are used to lash the head of the sail to the yard along the jackstay. The lashings holding the sail to the jackstay are called robands.
The following lists the running rigging used to set and douse the square sails.

**Sheets**

The *sheets* are attached to the *clews* of the square sails and are used to pull the clews down to the next yard below or, in the case of the course, down to the rough level of the main deck. In practice, the act of doing this is called *sheeting home*. 
Foresail Set

Foresail "In Its Gear"

Leechlines hauled taut, buntlines not yet hauled taut.
Clewlines
Opposing the sheets, and also attached to the clews, are lines which pull the clews of the square sails up to the yardarms. On the course only, these lines are called clew garnets, on the other square sails they are simply known as clewlines. Since the clewlines and clew garnets oppose the sheets, they have to be released in order to sheet home. Likewise, the sheets have to be released in order to haul on the clewlines.

Buntlines
Buntlines are attached to cringles in the foot of the sail. These run up the sail through bull’s eyes sewn into the front side of the sail, then through lizards attached to the jackstays and from there through turning blocks before leading down to the deck. When dousing sail these lines pull the bunt of the sail up to the yard.

Leechlines
As the name implies, these are attached to the leech of the sail. They are use when dousing to pull the leeches of the sail up to the yard.

Tacks
Tacks are used on the fore course only. Because this sail does not sheet home to a lower yard, the clews of this sail are positioned in space through a combination of sheets and tacks. The sheets position the sail from aft; the tacks position it from forward. Since they oppose each other, to haul on a tack means you have to slack the sheet, and vice versa.

Halyards
On square sails, the halyard is used to hoist the yard that the sail is attached to. On the brigantines, the two lower yards are fixed and the upper two yards are set by hauling on halyards. The halyards are hauled after the sail is sheeted home.

The lines used to control the squares are grouped logically at the base and sides of the foremast. The sheets of the upper three squares come down to a fife rail at the base of the mast. The clewlines, buntlines and leechlines are all grouped along the pin rails on either side of the
mast. The first group, as you move aft is the gear for the fore course. The next group aft is for the lower topsail, then the upper topsail and then the topgallant. Therefore, as you move aft on the pin rail, you find, successively, the gear that controls the next sail up the mast. The pin rail diagram on page 19 shows this in detail.

**Headsails and Staysails**

The *headsails* and *staysails* are known as *fore and aft sails*. These sails are triangular and set along the fore and aft line of the ship. They are attached to stays and generally take their name from the stay they are attached to. The upper corner of these sails is called the *head*. The edge of the sail that follows the stay is called the *luff*. The luff is attached to the stay with sail *hanks*. The trailing edge is called the *leech* and the bottom edge is called the *foot*. The lower corner where the luff and foot meet is called the *tack*. The corner where the leech and foot meet is called the *clew*.

The brigantines each have four headsails forward of the foremast and three staysails that set between the masts.

The four headsails, from nearest the foremast to farthest, are the: *fore staysail*, *fore topmast staysail*, *jib* and *flying jib*. 
The three staysails between the masts, from bottom to top are the *main staysail*, *main topmast staysail* and *main topgallant staysail*.

**Halyards**

The *halyard* is used to pull the head of the sail up the stay in order to set it.

**Downhauls**

The *downhaul* opposes the *halyard* and pulls the head of the sail down when dousing the sail.

**Sheets**

The sheets are *rove* through blocks that are attached to the clews of the sails with *sheet pendants*. They are used to trim the sail to the wind by hauling and slacking as the case may be.

**Clew Outhaul**

The main staysail, unlike all the other staysails, sets on a boom. The *clew outhaul* is used to
tension the foot of the sail along the boom. For this staysail only, the sheet is attached to the boom instead of to the clew.

### Gaff Mainsail

The mainsail and the gaff topsail are also referred to as fore and aft sails. They both set on the after side of the mainmast. The mainsail has four sides, and hence, four corners. The upper corner next to the mast is called the **throat**. The lower corner next to the mast is called the **tack**. The bottom edge of the sail is called the **foot**. On the other end of the foot from the tack is the **clew**. The after edge of the sail is called the **leech**. At the top of the leech is the last corner, called the **peak**. The edge running from the peak and back to the throat is called the **head**. The edge running down the mast from the throat to the tack is called the **luff**.

The luff of the mainsail is attached to *mast hoops* around the mast. The head of the sail is attached to the gaff and the foot of the sail is attached to the boom.

### Throat & Peak Halyards

Because the mainsail is attached to a gaff, it requires two halyards to raise the sail. The **throat halyard**, as the name implies, raises the throat of the sail, while the **peak halyard** raises the peak.

### Sheet

The *sheet* is attached to the main boom and controls the angle of the sail with the wind by either slacking or hauling as necessary.

### Gaff Topsail

The gaff topsail is a triangular shaped sail that, when set, fills in the area between the gaff and the main topmast. The leading edge of this sail
as it comes down the topmast is called the *luff*. The forward edge of this sail below the *luff* is cut to fit around the *doubling* of the lower mainmast and topmast. This cut is called the *nock*. The upper corner of the gaff topsail is called the *head*. the lower corner is called the *tack* and the third corner is called the *clew*.

**Halyard**

This sail is set “flying” from the deck. The *nock* is attached to a *leader* and the *halyard* is attached to the *head*. The *halyard* then hauls the sail aloft.

**Sheet**

The *sheet* pulls the clew out to the end of the main gaff.

**Tack**

The *tack* is used to tension the lower corner of the sail after the *halyard*, *sheet* and *leader* are secured.

**Lifts and Braces**

**Lifts**

There are three different types...
yard is hoisted. In a hoisted position with the square sails set, the leeches of the sails in effect tie all of the yards together. The lower yard (the foreyard) has adjustable lifts with a two-part purchase system. Because the leeches of the sails are in effect all tied together, all of the

Lifts and Braces
yards relative angle to the horizon can be adjusted by using the adjustable lifts on the lower yard.

The other lifts on board are the topping lifts on the main boom and the main staysail boom. Boom lifts come down from the maintop and support both sides of the main boom. These lifts are used to support the end of the boom. When the mainsail is set the weather lift is left taut and the leeward lift is slacked off in order that the mainsail will set properly.

The topping lift on the main staysail boom is a single whip, which supports the end of the boom when the main staysail is not set.

**Braces**

*Braces* are lines which control the angle of the yards with respect to the centerline of the vessel. These lines oppose each other so that one side has to be slacked so that the other side can be hauled on. Moving a yardarm forward is known as bracing up. Moving a yardarm aft is known as bracing in.

If you look at the geometry of the two hauling yards (the upper topsail yard and the topgallant) it will become evident that the braces on both of these yards will need to be slacked when the yard is hoisted. Likewise, the braces should be rounded in when the yard is lowered so that the yard does not swing out of control. The two lower yards (the course and the lower topsail) are fixed in place so that the length of the braces are not an issue when setting those two sails.

**The Location of Lines on the Pin Rail**

All crewmembers need to know the location and purpose of all the lines on the pinrails. All lines in use aboard the brigantines come down to specific locations, either to a belaying pin or to a cleat. Ignorance of the purpose and the location of a line could result in serious injury to fellow crewmembers or to the fabric of the vessel if the wrong lines are accidentally cast off. It will
soon become apparent either through use or through study that the lines are grouped and arranged in a logical fashion.

Generally speaking, the downhauls for the headsails will be found forward of the foremast in way of the aft end of the bowsprit. The halyards for hauling these headsails will be found on the port and starboard side of the foremast. The sheets for these sails are led to norman pins in the bulwark stanchions forward of the pin rails.

The foremast, with its square sails, has the most rigging associated with it. The pin rails are organized so that as you move up the mast, you move aft on the pin rail. Therefore, the lines that control the fore course are grouped together forward of the lines which control the lower topsail, which are forward of the lines for the upper topsail etc. Clewlines, buntlines and leechlines are grouped on the pin rails adjacent to the foremast. The sheets for the upper three square sails, as well as the fore course lifts, are found grouped logically at the base of the foremast on either the spider band around the mast or the fife rail at its base. The downhauls for the staysails between the masts are also to be found on the fife rail at the base of the foremast.

Halyards for the upper two yards are also arranged logically. The fore upper topsail halyard is found on the port side. Because it has a double purchase and leads through a turning block just aft of the foremast on the port side, it is easy to find. The halyard for the fore topgallant yard is found just opposite to the fore upper topsail halyard on the starboard side.

The sails on the mainmast together have less rigging than the square sails. The braces for the yards on the foremast will be found at the bottom of the mainmast on the pin rails. Halyards for the staysails between the masts as well as for the mainsail and the gaff topsail will also be found here. Sheets for the staysails and

The adults who work with our kids are nurturing, accepting (the demands are made by nature and evaluation is owned by nature), trusting and trustworthy.
the gaff topsail are here also, as well as the
topping lift for the main staysail boom and the
boom lifts for the main boom.

Sheets for the fore course are belayed to *bitts*
forward of a *sheave* let into the *bulwark* just
abaft the main topgallant backstays.

The accompanying diagrams should be used in
learning the location of the lines on the pin rails.
It is good practice, once you think you have a
pretty good understanding, for another crew
member to call out a line and have you be able
to go and identify the correct line without using
the diagram.