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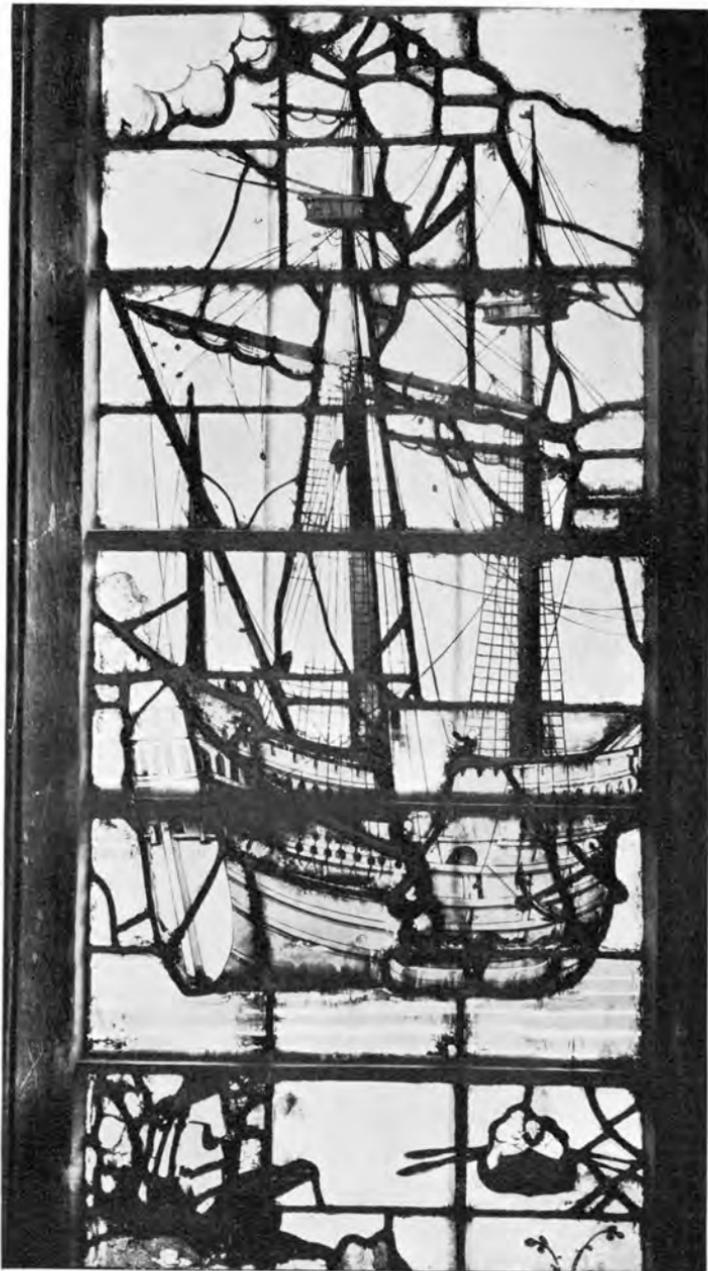
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*Photograph by Palmer Clarke, Cambridge*

The Ship in the windows of King's College Chapel, Cambridge

Monday, 29 November, 1909.

The Rev. Dr STOKES, President, in the Chair.

The following communication, illustrated with lantern slides, was made.

THE SHIP IN THE WINDOWS OF KING'S COLLEGE  
CHAPEL, CAMBRIDGE.

By H. H. BRINDLEY, M.A., and ALAN H. MOORE, B.A.

THE subject of the picture occupying the lower divisions of the two left-hand lights of the third window on the south side (counting from west) in King's College Chapel is St Paul saying farewell at Miletus. The scheme of the painting is as follows:—the lower portion is occupied by St Paul speaking to a great group of kneeling and sorrowing persons, the right upper portion shows us a massive castle on a sea-beach, while in the left upper portion, beyond the head of St Paul, we see a rocky cliff with a little vegetation, then a bay with a ship at anchor, a rowing-boat between ship and beach, and in the left background a high rocky hill. It is with the part of the painting containing the ship that we are concerned—that is, with the upper left-hand quarter of the whole picture, and in the description to follow this is treated as a picture by itself.

The ship is the most prominent feature of the painting, and she is portrayed with much wealth of detail. As we should expect for the age when the painting was made, she is a contemporary vessel: the unknown artist has given us a ship of his own day such as he may well have seen many times in the Port of London or at Antwerp, for we are told that of those responsible for the execution of the windows, two at least were Flemings. But whether English or from the Low Countries, he has left us a vessel stately and beautiful in herself and representative of an age whose naval architecture,

at least as regards northern practice, is known to us in detail only by very few trustworthy pictures and certain inventories of men-of-war. That there exists still unedited material of much value in Paris, Madrid and Holland can hardly be doubted, but even the far-reaching and scholarly labours of Jal, which culminated in his *Glossaire Nautique* of 1848, a work whose merit and importance have never been approached, failed in many directions to do more than point out the scantiness of the records of sixteenth century naval architecture.

The naval archaeology of this period is thus beset with difficulties. As an example may be mentioned the famous *Henri Grace de Dieu* of which some representation or other is familiar to most of us. This great ship was *sui generis* and before her time, indeed in some respects even a freak. She has been too often quoted as a type of the men-of-war of her day, which she certainly was not. Of the several portraits of her the best known are the one at Greenwich showing her under full sail, and the one in the Hampton Court painting of King Henry VIII embarking at Dover in 1520. Among the various manuscripts relating to her, some of which have been printed, there are two inventories, both at the Record Office, of which one has been printed by Mr M. Oppenheim in his valuable *History of the Administration of the Royal Navy and of Merchant Shipping in relation to the Navy*, vol. I., 1509-1660. The two inventories agree in most respects, but save as regards the number of masts and yards the pictures of the ship do not agree with them. The historical value of the pictures is therefore small. Thus so detailed a representation as St Paul's ship demands careful examination with the hope that light may be thrown on one or more of the many matters in doubt concerning the naval architecture of her age.

The Provost of King's College, himself the historian of the Chapel windows, informs us that he knows of no attempt to describe St Paul's ship in detail. On such a description we now venture.

The painting is unfortunately imperfect in certain places, for portions of the original glass have been replaced by small

irregular pieces without any attempt to reproduce thereon the presumably damaged parts of the picture. Though happily these renewals are too small to mar the general effect of the painting when seen from the floor, they create gaps in the ship's rigging which leave doubtful the identification of certain ropes and forbid any conclusions of value in the case of a few others. The renewals have affected the picture in six different places as below:—

(a) The starboard side of the foreyard is missing, save for a short piece close to the mast: the glass showing this short piece appears to be the original glass reset a little too low.

(b) The starboard yard arm (extreme outer end) of the main yard is missing.

(c) The upper part of the main topmast and the whole of the starboard side of the main topsail yard are missing.

(d) The midships part of the hull below the waist has several small pieces of glass inserted.

(e) The left-hand side of the foreground has small pieces of glass inserted, which somewhat deface the mass of rocks or low cliff occupying this part of the picture.

(f) The right-hand side of the base has been treated similarly, but very fortunately the repairs fall short of the small boat between ship and shore. It is therefore seen that the picture has at some time suffered serious damage, and the knowledge of how it should be restored has now passed from us for ever. We can only rejoice that so much remains unharmed and that the technical loss is not greater than it is.

The ship, which is speaking strictly a barque, as she carries no mizzen top, is depicted as seen from a little abaft her starboard quarter; thus the hull is somewhat foreshortened. She rides very high out of the water, and even making allowance for the foreshortening; this immense freeboard and the great height of her lower masts give an impression of crankiness. She is somewhat high even for a ship of an age when vessels were built with great freeboard for their length, judging by modern standards. It seems not unlikely that

the exaggeration in height was forced upon the artist, anxious to make the ship the prominent feature of the painting, by the narrowness of the window-light. Probably also to assist this object he omitted the bowsprit, save for its short inboard portion. The absence of this spar and its gear, we venture to think, is unfortunate in an artistic sense, and is to be much regretted as it deprives us of knowing how the bowsprit would have been rigged, while we should like to see more of certain gear which is cut short by the window-frame on its way to this spar.

The ship has her sails furled and is evidently at anchor or moored. For this her portside ground-tackle must be employed, as her starboard anchor is fished (i.e. made fast with its shank horizontal) to the ship's side by its cable, which we see bowsed through the hawse-hole so as to bring the stock hard up to the fore channels, and by a "shank painter" leading over the gunwale of the waist from a large ring at the crown of the anchor, a practice of old standing at this ship's day. In the relative proportions of this ring and the flukes to the other parts of the anchor, as well as in the angle of the arms to the stock, the painter has not been very careful, as is so commonly the case in drawings of the period.

Lying alongside the waist is an empty boat, which is evidently the ship's "great boat" or "boat," while in the boat either making for or away from the ship we may recognise her small boat or "cock" ("cokke," "cok," etc. of MSS.). As in *King Lear*:

"The fishermen, that walk upon the beach,  
Appear like mice; and yond tall anchoring bark,  
Diminish'd to her cock; her cock, a buoy  
Almost too small for sight."

Act IV., Sc. 6.

This boat has two oars a side, but we do not see who are handling them. Moreover it is difficult to feel confident as to which way the boat is going, for we see her end on, and there is little guidance as to whether her stem or stern is towards us. From the subject of the whole picture we should expect

the ship's master had just sent off the cock to take St Paul aboard, and indeed the end of her we see might well be the stem, while the carefully painted beardless face looking towards us suggests a man in the bows ready to step ashore. But close to him there is another man, with a beard, whose face we see in profile, seated crossways and nearer to us than the oars. This suggests that the two persons are in the stern-sheets, and therefore that the boat is pulling away from us. We must leave this not very important matter in doubt.

**THE HULL.** The form of hull is early in certain particulars and calls to mind the prints of Flemish ships of about 1480 reproduced by M. de la Roncière in his *Histoire de la Marine Française* and certain ships of the fifteenth century among the German and Flemish prints at the British Museum.

Such vessels must have been uncomfortable in a sea-way: a replica of the *Santa Maria*, the largest of Columbus' three vessels on his first voyage, was built in 1893 at the arsenal of Carraca from such contemporary data as were available. In the following year she was sailed across the Atlantic over the course taken by Columbus. The voyage occupied thirty-six days, while the best speed was less than seven knots. The vessel pitched horribly, and the sufferings of her crew appear to have been extreme. We see in St Paul's ship great sheer in combination with deep waist, high forecastle and poop. As far as we have accurate knowledge of the proportions of these parts, the artist seems to have preserved them in the general exaggeration of height which we have said above appears to have been forced upon him by the shape of the window-light. The great longitudinal "walings" or "rubbing streaks" of the period are very evident. The absence of a gabled shed on the poop and of a projecting gallery on the stern rather points to the artist having a small type of ship in mind, a supposition which is supported by the shortness of the mizzen mast and certain other features.

**THE SPARS.** The ship carries

(a) Bowsprit. Of this very little is seen, only the short inboard part of it, so that we do not see anything of the sprit-sail yard such a vessel would carry.

(b) Fore mast with Foreyard, Fore topmast with Fore topsail yard. The Fore topmast carries a small flag or pendant.

(c) Main mast with Mainyard, Main topmast with Main topsail yard.

As mentioned above, both fore and main lower masts are very taunt, in accordance with the general exaggeration of height. Both have the round saucer-like tops characteristic of the man-of-war of King Henry VIII's time and later.

From the maintop of St Paul's ship project two immense javelins or spears. This arming of the tops is a common feature of drawings of the period.

In our painted ship the fore mast rakes aft a little and the main mast a good deal. In ships of this time the fore mast usually raked forward while the main mast was stepped vertically, so it appears probable this was the effect really intended by the artist. The fore topmast is parallel with the fore mast, but the main topmast has its stay set up so tautly that it has an obvious forward rake. Both topmasts are small, as they were at this period; topmasts of length equal to or exceeding that of the lower masts were not seen before the seventeenth century. The topmasts are clearly stepped forward of the lower mast heads, and if the picture is a faithful representation, it is here of value as assisting to settle the great doubt whether the practice of the early sixteenth century was to step the topmasts forward of or abaft the lower masts.

(d) Mizzen mast and Mizzen yard. The mizzen mast is small relatively to the other masts, which suggests that we are looking at a vessel of the lesser kind. We now arrive at the first omission of importance. There is no outlygger (also "outlikker," "outlicker" and "outlooker" of MSS.). This was a spar, projecting from the stern, to which the sheet of the mizzen (sail) was led, and therefore the same kind of spar as the bumkin (boomkin) of certain rigs of small craft of the present day. As she is, if we look on her as a real ship, and not as a picture on glass, St Paul's ship could not have set her mizzen.

This point is illustrated by fig. 1, which is an attempt to represent St Paul's ship broadside on, with the outlygger and

mizzen sheet introduced. The stem, bowsprit and spritsail yard are also shown, while the parts of the foreyard, main and main topsail yards lost in the painting have been restored. The bowsprit rigging is shown as far as it may be inferred from the ropes which pass out of the picture and obviously lead to that spar. Beyond this the additions to the rigging are slight. These are the continuing of certain ropes which stop short in the picture, as far as we are able to decide on their lead, and the introduction of the rigging of the other side, where only that of one side is shown in the painting. One portion of the rigging about which there is doubt has been left incomplete. The shrouds of the port side have been omitted for the sake of clearness.

## EXPLANATION OF FIG. 1.

## SPARS AND SAILS.

- A Bowsprit. Very little of this spar is shown in the window. Its length in the diagram is largely conjectural, but is probably approximately correct. In Anthony's mss. (circa 1540) the bowsprit is represented as being longer than that of this picture.
- B The spritsail yard with the spritsail furled. This yard and sail are not shown at all in the window, but nearly all ships carried them at this period. The gear consisted of halyard or tye, braces, and sheets, but exactly how they were fitted is unknown. At anchor the yard was not left across, but was stowed in the head.
- C Fore mast.
- D Foreyard and forecourse.
- E Foretop.
- F Fore topmast.
- G Fore topsail yard and sail.
- H Main mast.
- I Mainyard and maincourse.
- K Maintop.
- L Main topmast.
- M Main topsail yard and sail.
- N Mizzen mast.
- O Mizzen yard and mizzen.
- P Outlieker. In the window this spar is omitted. It was not universal, but is here represented, because this ship would not be able to set her mizzen without it.

## STANDING RIGGING.

- I Fore shrouds.
- II Main shrouds. The three foremost of these, which are represented without

deadeyes, are discussed in the text. It may be that the artist intended them to belong to the port side, and that the maker of the window did not rightly interpret his design.

III Mizzen shrouds.

IV Fore topmast shrouds.

V Main topmast shrouds.

VI Main "puttocks" (probably), the futtock shrouds of later times.

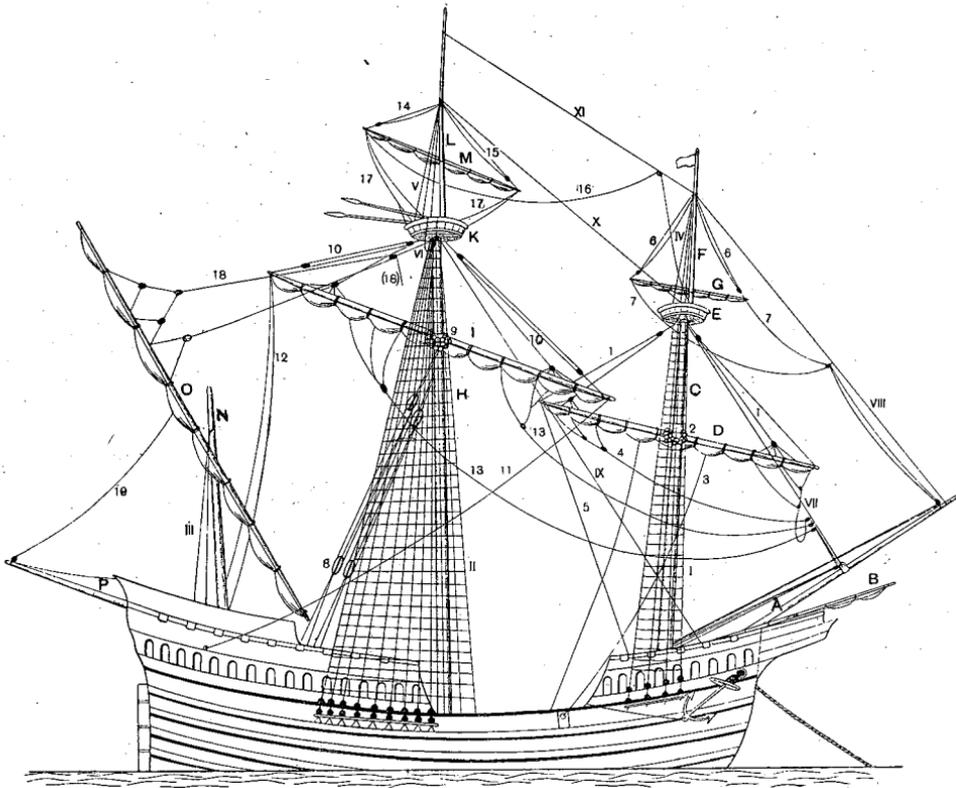


Fig. 1.

VII Forestay.

VIII Fore topmast stay.

IX Mainstay.

X Main topmast stay.

XI Flagstaff stay, or perhaps it would have been called the maintopgallant stay.

## RUNNING RIGGING.

- 1, 1 Fore lifts.
- 2 Fore parrell.
- 3 Starboard foresheet. (The port foresheet is shown in the diagram for the sake of symmetry.)
- 4 Port forebowline. (The starboard fore yardarm being lost in the window, the bowline, if it was shown, has gone with it. It is restored in the diagram.)
- 5 An unexplained rope.
- 6, 6 Fore topsail lifts.
- 7, 7 Foretop bowlines.
- 8 Drynges (probably).
- 9 Main parrell.
- 10, 10 Main lifts.
- 11 Starboard mainbrace.
- 12 Two ropes. Perhaps one is the mainbrace, or perhaps the mainbrace is represented in two parts, in which case the starboard mainbrace has one part omitted.
- 13, 13 Main bowlines. Whether they are correctly represented in the diagram as leading to the forestay is uncertain, but from the way they are shown in the window it is not clear where else they could lead, except the steeve of the bowsprit were most extreme.
- 14 Port main topsail lift.
- 15 Shown here as the starboard main topsail lift, but the matter is not clear from an injury to the window. (See figs. 3, 4 and text.)
- 16 Probably the port maintop bowline (see figs. 3 and 4). The fairlead on the flagstaff stay is not shown in the window, but what is shown is meaningless. The starboard maintop bowline is omitted or lost in the window and is not restored in the diagram, that confusion may be avoided in this difficult region.
- 17, 17 Probably, main topsail 'yard ropes,' braces being absent (but see figs. 3 and 4).
- 18 Mizzen lift. The fall ending in space (18) makes it impossible to be certain as to the lead of this rope.
- 19 Mizzen sheet. Probably omitted in the window, though a rope which appears to lead from the port main yardarm may really be the mizzen sheet.

All the yards are pointed to the wind and lie almost fore and aft. The lower yards are not hoisted right up. The fore topsail yard is lowered, while the main topsail yard is half-mast high ("half-mast" does not necessarily mean half-way up the mast). Among the directions for getting under way in *The Seaman's Grammar* (1653), which is an enlarged edition of John Smith's *Accidence, or the Pathway to Experience*

*necessary to all Young Seamen* (1626), we find "Hoise your sails half-mast high." And they are thus in St Paul's ship.

The unknown author of *The Complaynt of Scotland*, which was published in 1549, in his exact and spirited description of a ship getting under way, tells us "Then the master cryit, top your topinellis, hail on your topsail scheitis, vire your liftaris and your topsail trossis and heise the top sail hear," the last command seeming to mean, "haul the yard right up," or "chock-a-block" as the phrase now is, from the previous position of "half-mast." (The text is quoted from Sir James A. H. Murray's edition, p. 41.)

THE STANDING RIGGING. Of this we see:—

(a) Fore rigging. There are four shrouds on the side (starboard) nearer to us, and they lead to deadeyes (two to each shroud, with lanyards between the two) on channels outboard. Four shrouds are also seen on the port side.

(b) Main rigging. As was the custom in the sixteenth century, we find the main mast much more heavily stayed than the fore mast, which was usually smaller in comparison with the main mast than in this painted ship. There seem to be twelve shrouds on the starboard side, but the leading of the window makes it somewhat difficult to be certain of this. If twelve is the number, the forward three shrouds are made fast to the ship's side and not to deadeyes. The remaining nine lead to deadeyes (two to each shroud, with lanyards between the two) on channels placed outboard rather lower down than the fore channels. Whether fitting some of the shrouds without deadeyes was customary or merely a fancy of the artist we are unable to say. But there is evidence that at the close of the fifteenth century there were several methods of setting up the shrouds, so it is possible that we have here a combination of two of the methods, and that this combination was sometimes practised. The presence of ratlines on the three forward ropes shows that they were intended for shrouds. It is however possible that these three ropes were intended by the artist for port side shrouds and that a window painter brought them down to the starboard side in error. That the ship is a small one is again suggested here, for both

her fore and main shrouds are few compared with those of large men-of-war, at least of 1495-1498. In the *Naval Accounts and Inventories* for those years, which have been edited by Mr M. Oppenheim for the Navy Records Society and which supply most of the available detailed information as to the rigging of the time, we find that the *Governor* and the *Mary of the Tower* had six shrouds a side for the fore mast and sixteen and fourteen respectively a side for the main mast. In her possession of channels and "dedemeneyne" (dead-eyes) "S. Paul's ship" is well up to date, for this method of setting up was adopted in the English Navy only in the decade succeeding 1485, so far as the *Inventories* may be trusted. Whether it was common abroad before this time sufficient evidence is lacking, though a Flemish carrack of perhaps 1480, reproduced by M. de la Roncière (*Histoire de la Marine Française*, II, 1900, p. 221), has channels and deadeyes.

Till 1485 it was the practice to make fast at least the fore shrouds inboard, though possibly the main shrouds were often led to channels before that time. In the Flemish carrack above mentioned there are deadeyes (two to each shroud, with lanyards between the two) fitted to all fore, main and mizzen shrouds. There are fourteen main shrouds a side and of these the aft ten have their deadeyes on a "chain-wale," the lower deadeyes of the four forward shrouds being chained to the ship's side. This difference in the mode of making fast a small number of the forward main shrouds is a parallel with S. Paul's ship, and suggests that it was not an uncommon practice to fit the main shrouds in two sets.

Both fore and main shrouds have ratlines from the gunwale to the tops. Through fading or, more probably, chipping off of the paint, certain portions of the shrouds and their ratlines have vanished. This is the case in particular near the tops and half-way up the main shrouds. Moreover, the ratlines are absent from most of the length of the three forward main shrouds, though the latter are quite distinct, which leaves a doubt whether the ratlines were completely inserted by the painter in this place. It is noticeable that it is these same

three shrouds which are made fast without deadeyes. The shrouds, and especially the ratlines of the fore mast, have been put in with a thicker brush than those of the main mast, and by a less even hand.

(c) The Mizzen mast has two shrouds on each side. These have no ratlines and are made fast inboard.

(d) Forestay and Fore Topmast Stay. Neither of these is seen completely, partly because they lead to the bowsprit and partly because they enter places where, as already mentioned, new glass has been inserted.

(e) Mainstay. This leads to just forward of the fore mast and presumably is intended to make fast to the deck. Making this stay fast to the bowsprit was of later date. Main Topmast Stay. This leads to the foremast head: its upper portion is lost in the repairs in which the main topmast has so largely disappeared.

(f) Other parts of the standing rigging:—

From under the flag at the fore topmast head we see the beginning of a rope which must have led from the vanished main topmast head. The rest of this rope is lost in the repairs to this region. It is clearly a piece of standing rigging, for from it there lead down two short lengths of running rigging we shall discuss later on. Thus the standing piece is like a main topgallant stay, though it could not be called by this name, as the ship carries no topgallant masts, which were not common, at any rate in small vessels, till a later day. This stay is somewhat of a puzzle together with the ropes running down from it.

No "sweftyng tackles" ("swiftern" of later times) are shown. These were tackles inboard of the shrouds, which they assisted in preventing the masts from "straying." They were regularly fitted in larger vessels but not so often in small ones; thus their omission is further evidence that we are looking at a small ship.

The rope of the period was certainly poor, and its weakness was recognised in the abundant and heavy standing rigging.

Neither does the ship carry "crowfeet" or "cranelines," which were complicated tackles acting as backstays to the

masts. It is, however, not certain if these additional supports were employed in King Henry VIII's reign.

#### THE RUNNING RIGGING.

(a) The Bowsprit. The spritsail yard does not come within the limits of the picture.

(b) The Foreyard and its gear. No halyards or tyes are shown. These hoisted the yard and ran close to the mast, so their omission might be expected.

The Lifts are shown. Their details are not quite clear, but they seem similar to the main lifts, which will be noticed later.

The Fore Parrell is indicated by a slight thickening where the yard crosses the mast. (Parrells were of various kinds, but were all essentially bands which kept the yard against the mast. A common form was a kind of necklace of "ribs" and "trucks"—pieces of wood strung on a rope. "Ribs and trucks" survives as an expression for trifles in East Anglia.)

The Fore Braces are not shown. It is uncertain how the forebraces led at this period—no picture is satisfactory as to details. There is little doubt, however, that they led to well forward on the mainstay, in two parts, one part being made fast thereto, while the other was brought to the forecastle. All we can say is that this was the arrangement in Queen Elizabeth's reign, and from the number of blocks mentioned in the Inventories it seems probable that in the time of King Henry VIII their lead was the same.

The Starboard Foresheet is shown, leading from the sail furled under the yard to a hole in the ship's side just abaft of the break of the forecastle. The Port Foresheet is omitted.

The Port Fore Bowline, with two bridles, is shown, but not the starboard one.

The Fore Tacks are not shown. These led forward, perhaps to the beak head, but whether quite so far forward is uncertain.

The following piece of gear we cannot explain. This is a single rope from the port foreyard arm on which a man on the forecastle is hauling. Perhaps this rope should be continued above the yard arm to the maintop.

(c) The Fore Topsail Yard and its gear.

No Halyards are shown. These would not be prominent in an actual ship.

The Fore Topsail Lifts, in two parts, are shown.

The Fore Topsail Braces are not shown. How these led at the time of the picture is uncertain (see under "Fore Braces"), but later on they were brought to the main topmast stay. At the end of the fifteenth century they were not always fitted in small ships, and so their omission here may be intentional.

The Fore Topsail Sheets are not shown. These might easily be forgotten in a picture. It may have been the practice to unbend them in harbour, but in a ship about to proceed to sea one would expect to see them bent.

The Foretop Bowlines. These appear to be represented by a rope leading forward and downward from the starboard yard arm and by one, of which a portion of the lead is not visible, leading forward and downward from the port yard arm. But against these ropes being the bowlines we see no bridles on them, and also the ropes come from rather far out along the yard for bowlines.

(d) The Mainyard and its gear. At this time the mainyard was hoisted with halyards, tyes and gears, which last were an assemblage of tackles. None of these are shown with certainty, though we see two large tackles leading down abaft the mainyard, but they come to the mast at the wrong place for any hoisting gear. It is possible, however, that their position is a window-painter's error. Perhaps these tackles are not halyards represented faultily, but are really "drynges," which we find in inventories of the time. What drynges really were has been much debated. It is possible that they were tackles for setting up the parrell and trusses. St Paul's ship carries a main parrell of the necklace type—it is drawn very carefully—and the two tackles which look like halyards appear to be connected with this parrell. Hence they may be drynges and not halyards. On the other hand they may be truss tackles instead of parrell tackles. But, when all is said, we do not know whether drynges were parrell tackles or truss tackles. A point in favour of the two doubtful tackles in the

painting being drynges is that the inventories usually mention the latter in pairs. But we cannot arrive at any satisfactory conclusion.

The Main Lifts are shown in at least two parts, but in this connexion we find another obscurity. Inboard of the lifts and somewhat separated from them comes a rope ending in a "crowfoot" to the yard. As this rope is drawn as though it had a strain upon it, it may be part of the lift. If this is not so it may be the "martnetts," which were leechlines bent to the leech of the sail by crowfeet. There seems, however, no sure evidence of martnetts before Queen Elizabeth's reign, and in pictures in which there is no doubt about their presence they are always shown hanging slack from the yard (see fig. 2), while the gear under discussion is taut. In the present picture there are traces of a similar fitting at the port foreyard arm.

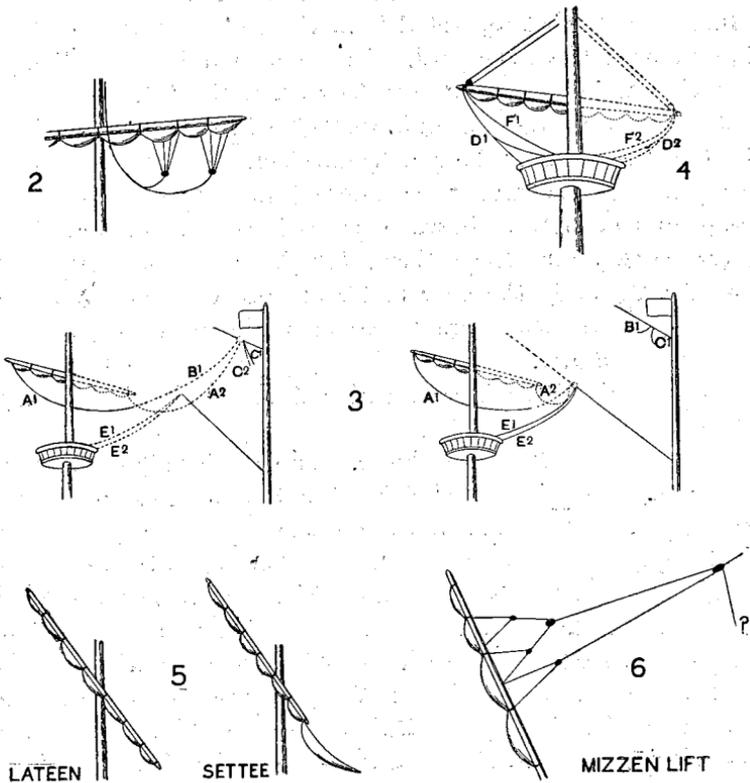
The Main Parrell, as mentioned above, is shown very clearly.

The Main Braces are shown. The starboard brace is in one part, while in actual ships the braces were usually in two parts. The main brace on the port side presents a difficulty. From the yard arm come two ropes, the inner one of which leads to the poop and is clearly a brace; the outer one seems to be the same as a rope which leads from below the mizzen yard to the poop. If this is the case the brace is in two parts, but its block on the yard arm is omitted. On the other hand it is possible that the rope below the mizzen is really the mizzen sheet, in which case the short length of rope from the port yard arm outside that which is certainly a brace remains unexplained, though it may be a portion of an imperfect representation of the brace in two parts.

The Main Sheets are not shown. These we should expect to see, as they were very prominent ropes. It is possible that the artist intended for the main sheets the ropes we have identified above as the main braces, the window-painter having put them too far out along the yard.

The Main Bowlines are seen. They lead towards the bowsprit, and so of course are not shown entirely. We have

no exact information as to their lead at this period, and so our regret that the artist omitted the bowsprit again finds expression. The main bowlines have the same number of bridles as the fore bowlines.



Figs. 2 to 6.

The Main Tacks are not shown.

Furling gear. We may observe here that, save for the occasional mention of a brail, the Inventories contain no gear for hauling up a sail to its yard, the purpose of brails and also of the buntlines, clewlines and leechlines of later times. It is noteworthy, in the scarcity of pictures of the time showing details, that the painting has nothing of such furling gear.

(e) The Main Topsail Yard and its gear.

The Main Topsail Halyards are not shown (see "Fore Topsail Halyards" above)

The port Main Topsail Lift is shown in two parts. The starboard one has vanished in the repairs which destroyed the starboard yard arm, for most likely it was once in the picture.

The remaining gear of the main topsail yard is a puzzle. From the port yard arm comes a rope which is led to the main topmast stay (A1 in fig. 3). Presumably, if the starboard yard arm had not vanished from the picture, we should see a similar rope (A2) leading from it. From the main topmast stay back to the maintop come two more ropes, E1 and E2. Now are these two the same ropes as A1 and the presumed A2, which may be the maintop bowlines? But if A1 is a bowline, the same criticisms apply to it as to the foretop bowlines. On the other hand, is A1 really continuous with B1 and B1 continuous with C1, two ropes led to the stay which is apparently fitted like a main topgallant stay and which we have already discussed? We should indeed expect the maintop bowline to lead to the main topmast stay, so it is not improbable that this bowline is here led to the additional main topmast stay which the artist has introduced. But if this is the case, what are E1 and E2? Perhaps they are part of the fore topsail braces, the rest being omitted. But if this is the case such a lead is at variance with what appears to have been the practice of the time, viz., that fore topsail braces led from the main topmast stay to the forecastle. Or again, is A1 a brace led forward? We doubt this, for we know of no such leading for this brace. By leading a brace forward valuable support to the yard when the ship is under canvas would be sacrificed. Though much has been lost by the repairs in this part of the picture, we are inclined to believe that the window painter mixed things up. In fig. 1 (16) A1 and B1 are represented as the port maintop bowline, with its fall led to the foretop.

The main topsail yard has another set of gear which is very baffling. This is disposed as follows:—from the port yard arm come two ropes, both of which appear to lead into the main-

top. These are D1 and F1 in fig. 4. The outboard rope (D1) splits into two. Now it is possible that the two ropes E1 and E2 of fig. 3 discussed above, which appear to come from the main topmast stay, really lead from the vanished starboard yard arm and have nothing to do with the stay. If this is so, one of them might be a "yard rope," i.e., a single rope employed during this period when the yard was not thought big enough to demand a brace, and we are dealing with a rather small vessel. This would account for F1 of fig. 4, but leave D1 a mystery. It was a most unfortunate accident which deprived the ship of the starboard side of the main topsail yard.

Under the maintop are four bights of rope. We do not know what they represent. They may be for the same purpose as the "puttocks" ("futtock shrouds" of a later day), viz., to provide a means of getting into the top from below; or, if the top had a "lubber's hole" at this time, to give foothold for reaching the inside of the top through its floor. On the other hand, these bights of rope may be intended for crane lines. Contemporary pictures often show a kind of davit or crane projecting over the side of the top, and through this fitting is rove a rope ("craneline" of MSS.) to which buckets or bundles are attached. This gear was for hoisting spears, stones and other projectiles to the men in the tops, and also ammunition for the small cannon (which were sometimes true quickfirers) not infrequently placed in the tops. This hoisting gear seems to have been abolished early in the seventeenth century, as the tops came to be manned by marines with small firearms, the ammunition for which was carried on the persons of the men. But with the revival of the fighting-top for carrying light guns we see the davit and its hoisting-rope again, and they continued to be a regular fitting of the modern man-of-war till about ten years ago, when guns again disappeared from the tops. In the *Complaynt of Scotland* (edit. cit. p. 41) we read how the master commanded: "Every quartar master til his auen quartar. Boitis man, bayr stanis and lyme pottis ful of lyme in the craklene pokis to the top, and paueis veil the top vitht pauesis and mantillis." (We are indebted to Mr Morton Nance for calling our attention to the

above passage.) The "craklene pokis" were the craneline pokes or bags for hoisting ammunition. We much doubt, however, if the bights of rope under the maintop of St Paul's ship are intended for crane lines, as no "crane" is fitted in the top, while in pictures of the period the gear is depicted very uniformly and never in the manner seen here. The foretop is without these bights of rope.

(f) The Mizzen Yard and its gear. The sail is furled beneath the yard, which comes so low to the poop that there can be no sail beyond it. Thus the sail is a lateen and not a settee (see fig. 5).

The Mizzen Halyards are not shown.

A "Crowfoot" or spreading arrangement of tackles which acted as a mizzen lift is shown, and close inspection reveals that it is rigged as in fig. 6. This lift is led to the main mast under the top.

A rope which may be a sheet can be seen leading apparently from the furled sail to the tafferel, but this rope we have referred to above in describing the main braces as possibly part of the port main brace. Again, if the rope is the mizzen sheet it is unusual in being a single rope: we should expect to see it in two parts with a block on the clew of the sail. Matters are in this portion of the picture rather vague, because of the absence of the outlygger or spar projecting from the stern, to which the mizzen sheet led. This omission we have mentioned already, and need only say here that, while outlyggers were usual, they were not universal; nevertheless, the ship we are describing could not have set her mizzen without this spar, as the sail is too large to be spread by a sheet which leads only to the tafferel.

The above description has been written from the excellent photograph which the Provost has caused to be made of the ship, and partly from the window itself seen through a glass. It is too high from the Chapel floor for satisfactory examination by the unaided eye. It is possible, however, that some of the ropes which are incomplete might be traced further by close examination of the glass. Though there is no doubt that, while the photograph reproduces all that is at all obvious, it

is possible that where ropes seem wanting there may be here and there faintly coloured fragments which would assist in clearing up some of the doubtful points.

The colouring of the ship is conventional; the hull is light brown or buff, while the masts and other spars are almost golden, the furled sails being white. These colours against the blue of the sea and of the heavy canopy of clouds overhead give a very beautiful effect.

We may mention here that the absence of external decoration of the hull is in accord with the ship being a small one. At this time there was but little ornamentation even in large vessels like the *Henri Grace de Dieu*, though some of the great ships of the early sixteenth century had "pavesses" (painted wood shields) placed along the sides, as well as hangings of "say," and up aloft many "gittons" (forked pendants), "standarbes" and "stremers." Lavish decoration of the hull with gilded and painted carvings was a feature of the succeeding century.

In describing the painted ship of King's College Chapel it has been a little difficult always to bear in mind that she is a painted one, and that therefore she cannot sail nor can her gear be put to use. Thus we fear we have here and there expected too much from her designer. But the general impression we have is that she was originally drawn by a man who understood the uses of the various fittings and ropes, while the actual painter or painters did not. The mistakes and omissions in this picture seem to us on the whole those that a nautically ignorant though capable artist makes, the artist in this case being the copyist of a drawing which was better than his reproduction. All this is, however, supposition, as we believe it is not known to what extent the windows were actually painted by their designers or executed by other artists from drawings supplied to them.

The ship is of a type which came in about 1490 and lasted for a century as far as rig is concerned. She may quite well be called an English ship: there is at least nothing to show she is not, though it would require more information than is now available to point to any feature of her hull or rig which would mark her out as a vessel hailing from England, France

or the Low Countries in particular. We know next to nothing of the differences between ships of the northern nations of this age, but it is unlikely they were marked. We have already stated that in certain features the hull is rather early, but certainly of a design built to as late as 1500. The smallness of the topsails and the apparent absence of true braces suggest early in King Henry VIII's reign. Still, we see nothing against putting the date of the ship as 1520, but bearing in mind the possibility of an artist's omissions it would be difficult to prove error in calling her a ship of 1580. This last suggestion need not be considered seriously, as it appears certain that all the Chapel windows were finished by 1540, and perhaps even some years earlier. There exist only two or three trustworthy drawings and only one set of Inventories (of English men-of-war) for the few years on either side of 1515, so that St Paul's ship is, we feel, as useful in helping the archaeologist as is the archaeologist in his attempt to elucidate her. But then again we come back to the questions of how far her designer was qualified for his work and what kind of ship he sought to represent. On this we think that he was very fairly qualified and that his workmen have not given us his best. Nevertheless he has left us a ship of a type which was modern in his day, and his painting should have mention in any history of naval architecture of the period 1490 to 1590, a period in which there were but few changes, of which changes trustworthy records by either pencil or pen are unfortunately very scanty.

For all information of a general kind about the painting we are indebted to the Provost's account of the Chapel windows which forms the Appendix to Mr C. R. Fay's *King's College, Cambridge*, and to Dr James himself for kindly giving us assistance on certain points.

It is unfortunate that the many beautiful models of ships at Greenwich Hospital, at South Kensington, in the Museum of the Royal United Service Institution, in the Musée de Marine at the Louvre and in the Naval Museum at The Hague are of very little value as guides to the details of rigging, for hardly any are contemporary, but have been made from old

pictures by naval pensioners and others, mostly in the last two centuries, who have persistently embodied in the models the rigging practice of their own day. As regards the hulls they are useful, but taken as a whole museum models of old ships are full of anachronisms.

The following works may be mentioned as sources of information on the ships of the fifteenth to the seventeenth centuries and modern forms of the gear they carried. We have to thank Mr L. G. C. Laughton for kindly assisting us in making this bibliography.

- xvth Century (first half and reign of Queen Elizabeth). Naval Inventories preserved at the Record Office. These have not yet been printed.
1549. *The Complaynt of Scotland*. The edition quoted in this paper is that of Sir James A. H. Murray, published by the Early English Text Society, 1872. The detailed account pp. 40-42 of a galeasse getting under way has considerable historical value.
1586. WAGANAER, LUCAS. *Speculum Nauticum* (Leyden). A work on pilotage, with incidental remarks on ships, translated into English by Anthony Ashley in 1588.
1599. BOURNE, WILLIAM. *De Const der Zee Vaerd*t (Amsterdam).
1601. ROMANO, BARTOLOMEO CRESCENTIO. *Nautica Mediterranea*. With plates.
1626. SMITH, JOHN, Governor of Virginia. *An Accidence, or the Pathway to Experience necessary for all young Seamen* (London). In 1653 a useful enlarged edition was published under the title of *The Seaman's Grammar*, and in 1691 a third edition, *The Seaman's Grammar and Dictionary*, appeared. This was improved by the addition of a treatise on gunnery. Smith's short book of 1626 was the first, or at least a very early one, professing to teach seamanship.
1629. FURTTENBACH, J. *Architectura Navalis das ist von dem Schiff* (Ulm). With plates.
1643. FOURNIER, GEORGES. *Hydrographie* (Paris). With plates.
1644. MAINWYRING, SIR HENRY. *The Seaman's Dictionary* (London). This very useful book commences with "The State of a Christian lively set forth by the Allegory of a Ship under Saile." It was written about twenty years before its publication.
1660. HAYWARD, EDWARD. *The sizes and lengths of Riggings of all his Majestie's Ships and Frigates*.
1676. MILLER, THOMAS. *The Compleat Modellist*. A second edition appeared in 1684.
1677. BOND, HENRY. *The Boatswain's Art*.

1678. BUSHNELL, EDMUND. *The Complete Shipwright*. This is the fourth edition.
1685. BOTELER, CAPT. NATHANIEL. *Six dialogues about sea services between an High Admiral and a Captain at Sea* (London). This was a venture by a bookseller, Moses Pitt, and it contains a dedication to Pepys by him. The original ms. is in the British Museum. The printed book is fairly complete, but contains blunders owing to lack of a competent editor.
1695. ALLARD, C. *Nieuwe Hollandse Scheepsbouw, waar in Vertoond word een volmaakt Schip* (Amsterdam).
1695. NARBOROUGH, SIR JOHN. *The Mariner's Jewell*.
1704. BOND, HENRY. *The Art of apparelling and fitting any Ship*.
1711. SUTHERLAND, WILLIAM. *The Shipbuilder's Assistant*. This is useful for showing the changes since John 'Smith's time.
1715. *Introduzione all' Arte Nautico de Piloti, etc., sopra il mare* (Venezia). A work on navigation, but containing a large plate of a full-rigged ship with all parts of the rigging named.
1736. AUBIN, —. *Dictionnaire de la Marine* (Amsterdam). 2nd edit. This was also published in Dutch.
1747. DU MONCEAU, H. *Traité de la fabrique des manoeuvres pour les Vaisseaux ou l'art de la corderie perfectionné* (Paris, Imprimerie Royale).
1769. FALCONER, WILLIAM. *An Universal Dictionary of the Marine* (London). This is the best English work of its kind. There were many subsequent editions.
- 1800-2. CHARNOCK, JOHN. *An History of Marine Architecture* (London). 3 vols. Chiefly of use for information concerning hulls.
1840. JAL, A. *Archéologie Navale* (Paris). This is a very learned and suggestive work.
1848. JAL, A. *Glossaire Nautique* (Paris). The classical work on naval archaeology.
1851. FINCHAM, JOHN. *History of Naval Architecture*.
1890. LESLIE, R. C. *Old Sea Wings, Ways and Words in the days of Oak and Hemp* (London).
1891. ARENHOLD, L. *Die historische Entwicklung der Schiffstypen* (Kiel). This work has good plates.
- 1894 onward. Volumes of the Navy Records Society.
1896. DE LA RONCIÈRE, CHARLES. *Histoire de la Marine Française*. Tome I (Paris). Also tome II (1900) and tome III (1906). This work contains reproductions of prints of fifteenth and sixteenth century vessels from the Bibliothèque Nationale and other sources, and also gives descriptions of ships.
1896. OPPENHEIM, M. *A History of the Administration of the Navy and of Merchant Shipping in relation to the Navy*. Vol. I, 1509-1660 (London).

1896. OPPENHEIM, M. *Naval Accounts and Inventories of the Reign of Henry VII, 1485-8 and 1495-7*. Navy Records Society, vol. VIII.
1899. CORBETT, JULIAN S. *Drake and the Tudor Navy* (London). Contains much information on hulls, tonnage and armament of Elizabethan ships, as well as reproductions of pictures from Visscher's Series and Anthony's Rolls.
1902. OPPENHEIM, M. "The Tudor Navy" in F. P. Barnard's *Companion to English History [Middle Ages]* (Oxford).
1906. ARENHOLD, L. *Die allmähliche Entwicklung des Segelschiffes der Römerzeit bis zur Zeit der Dampfer* (Berlin).
1906. MASEFIELD, JOHN. *On the Spanish Main* (London). This contains a chapter on sixteenth century ships with reproductions of contemporary prints.
1906. HOLMES, SIR GEORGE C. V. *Ancient and Modern Ships*. Board of Education publication.
- 1906-7. WHALL, J. B. Reproductions of pictures of Ancient Ships. *Yachting Monthly Magazine*.
1907. "The Evolution of the Ship." *Nautical Magazine*. May—July 1907 (Glasgow).
1909. CHATTERTON, E. K. *Sailing ships and their Story* (London). The last four works are useful for the illustrations they give of fifteenth century and later ships.
1909. MOORE, ALAN H. "The Ship, A.D. 1485." *United Service Magazine*, March, 1909.
- "The Ship, 1495-1515." *Loc. cit.*, November, 1909.

The Print Room of the British Museum and the Département des Estampes of the Bibliothèque Nationale, Paris, contain many pictures of fifteenth and sixteenth century vessels of much historical value, which still remain unedited, while Visscher's series of prints, published in Holland about 1589, to illustrate the Armada campaign, and the pictures in Anthony's Rolls at Magdalene College must also be mentioned as sources of information on the ships of their time.

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